



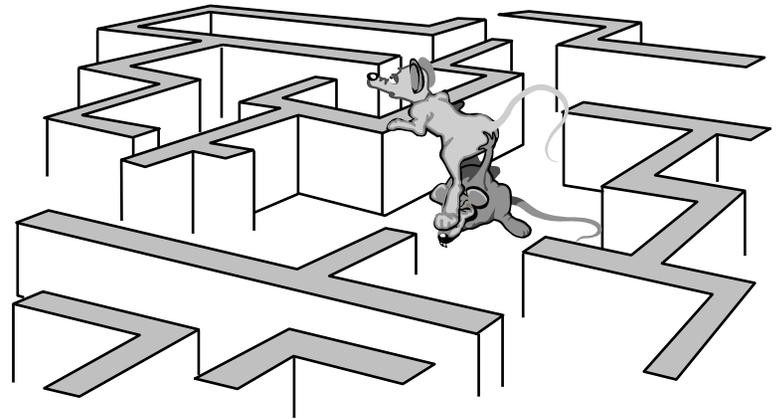
System Troubleshooting

July 2006

Overview of Lesson



- **Introduction**
- **System Troubleshooting Topics**
 - **Configuration Parameters**
 - **System Performance Monitoring**
 - **Problem Analysis/Troubleshooting**
 - **Trouble Ticket (TT) Administration**
- **Practical Exercise**



Objectives



- **Overall: Proficiency in methodology and procedures for system troubleshooting**
 - Describe role of configuration parameters in system operation and troubleshooting
 - Conduct system performance monitoring
 - Perform COTS problem analysis and troubleshooting
 - Prepare Hardware Maintenance Work Order
 - Perform Failover/Switchover
 - Perform general checkout and diagnosis of failures related to operations with custom software
 - Set up trouble ticket users and configuration

Importance



Lesson helps prepare several roles for effective system troubleshooting, maintenance, and problem resolution:

- DAAC Computer Operator, System Administrator, and Maintenance Coordinator**
- EMD System Administrator, System Engineer, System Test Engineer, and Software Maintenance Engineer**
- DAAC System Engineers, System Test Engineers, Maintenance Engineers**



Configuration Parameters



- **Default settings may or may not be optimal for local operations**
- **Changing parameter settings**
 - **May require coordination with Configuration Management Administrator**
 - **Some parameters accessible on GUIs**
 - **Some parameters changed by editing configuration files**
 - **Some parameters stored in databases**
- **Configuration Registry**
 - **Script loads values from configuration files**
 - **GUI for display and modification of parameters**
 - **Script moves (re-names) configuration files so system servers obtain needed parameters from Registry Server when starting**

System Performance Monitoring



- **Maintaining Operational Readiness**
 - **System operators -- close monitoring of progress and status**
 - Notice any serious degradation of system performance
 - **System administrators and system maintenance personnel -- monitor overall system functions and performance**
 - Administrative and maintenance oversight of system
 - Watch for system problem alerts
 - Use monitoring tools to create special monitoring capabilities
 - Check for notification of system events

Accessing the EMSn Web Page



- **EMSn (formerly EBnet) is a WAN for system connectivity**
 - DAACs, EDOS, and other EOSDIS sites
 - Interface to NASA Internet (NI)
 - Transports spacecraft command, control, and science data
 - Transports mission critical data
 - Transports science instrument data and processed data
 - Supports internal EOSDIS communications
 - Interface to Exchange LANs
- **EMSn home page URL**
 - <http://bernoulli.gsfc.nasa.gov/EMSn/>

EMSn Home Page



EOS Mission Support Network

Web Search by Google **GO**

- Design and implementation
- Modeling
- Costing
- Traffic Requirements
- Operational Status
- Status
- What's New
- Links
- Contacts
- Home

Search NASA sites **GO**

Nasa Security Warning Banner

EOS
MISSION SUPPORT

This site contains information relevant to the Earth Science Data Information System (ESDIS) Project mission and science processing networking activities. The mission portion of the networks are referred to as the EOSDIS Mission Support network (EMSn). The science processing portion of the networks are provisioned through EOSDIS Science Support network ([ESSn](#)). The NASA Integrated Services Network (NISN) is the primary service provider for ESDIS wide area requirements.

EMSn consists of both a routed data and serial clock & data transport infrastructure. The AM-1 spacecraft commands and telemetry (both low rate and high rate) are handled as serial clock & data. All other traffic is carried over Internet Protocol.

ESDIS science processing traffic consists of science product outflows from the DAACs , Science Computing Facility (SCF) traffic, basic user traffic, and Quality Assurance (QA) site traffic. It is all carried over Internet Protocol.

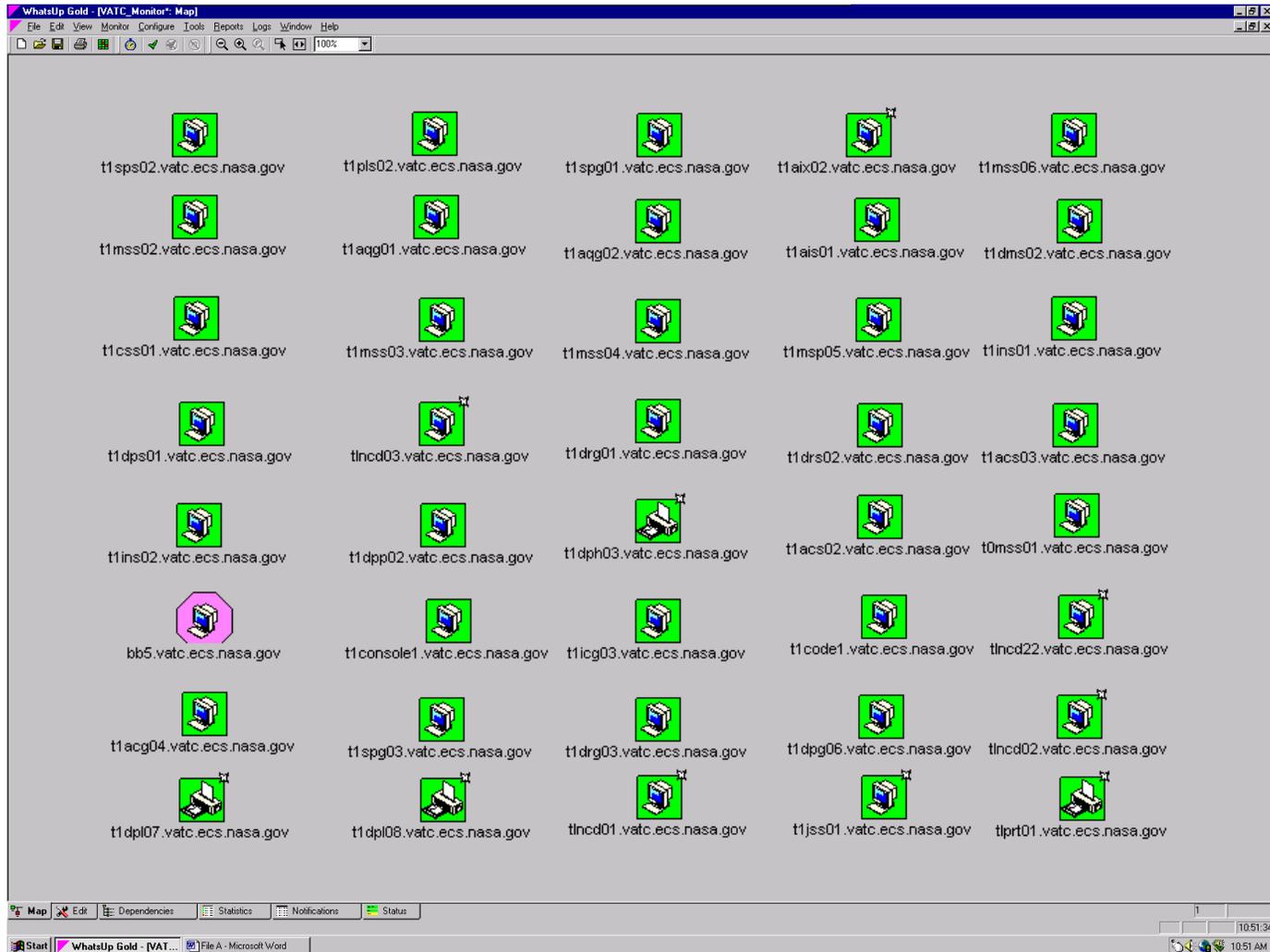
Checking Network Health & Status



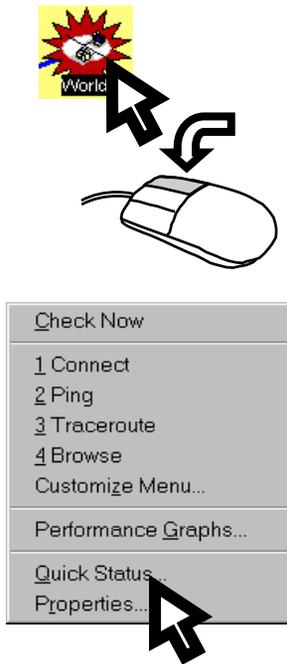
- WhatsUp Professional graphic network monitoring tool
- Installation establishes network map and initial notifications, device properties, and polling
- Color alerts indicate status of mapped nodes
 - *highlighted name*: an event has been logged
 - *green square background*: device is up
 - *light green diamond background*: one poll missed
 - *yellow diamond background*: two polls missed
 - *red elongated diamond background*: device is down (after eight polls are missed, background is red starburst)
 - *light purple octagon background*: a service is down
 - *gray square background*: monitoring turned off



Checking Network Health & Status: WhatsUp Professional Network Map



Checking Network Health & Status: WhatsUp Professional Status Display



WhatsUp Gold – [VATC_Monitor*: Map]

Categories

- Status
- History
- Up-Time
- Log

Status

Status: Active and responding

Count: RTT:

ICMP Status

Down Count	Total	Last Response Time:
<input type="text" value="123"/>	<input type="text" value="2620"/>	<input type="text" value="Not since initialization"/>

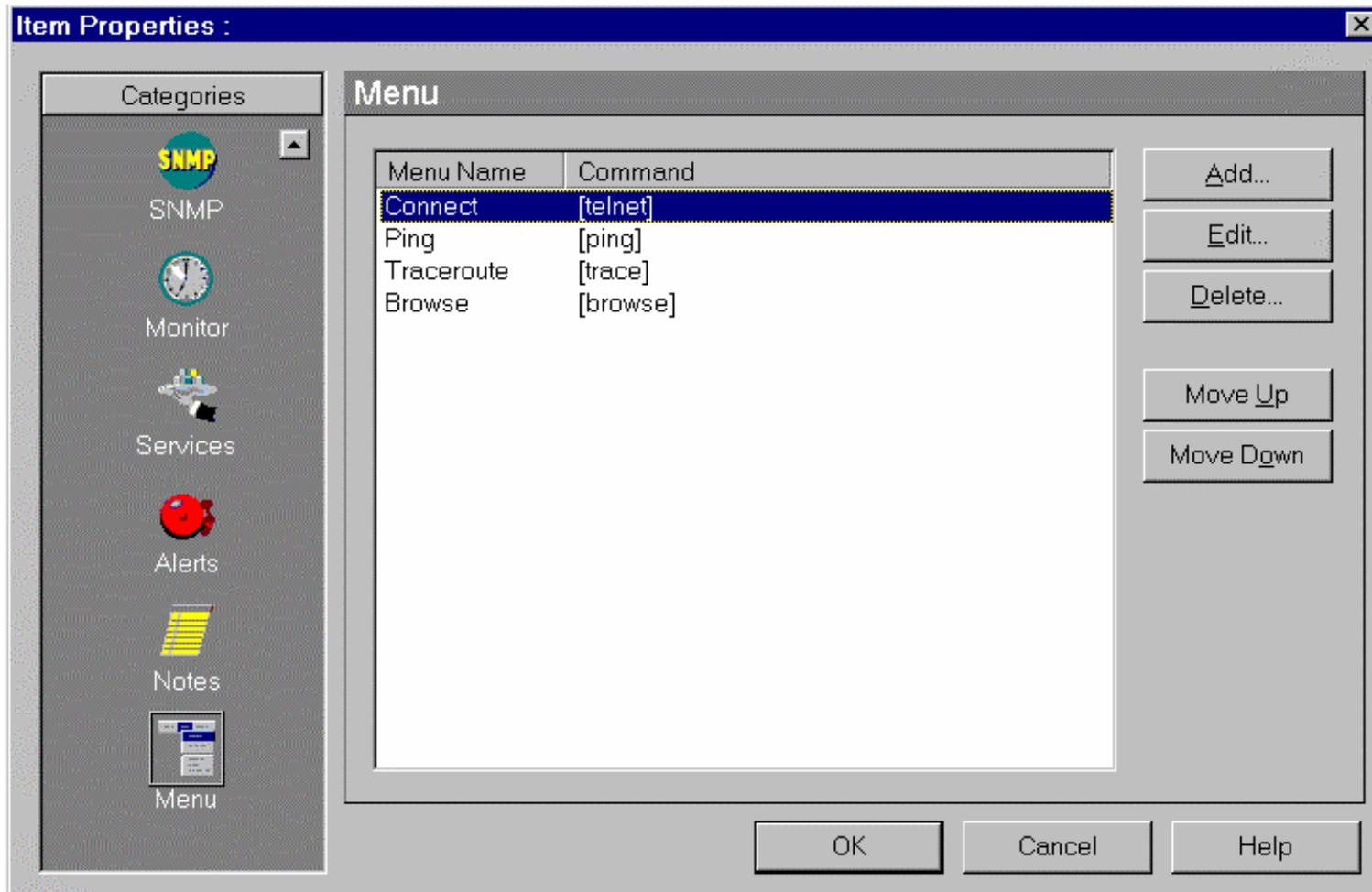
Service Status

Down Count	Total	Last Response Time:
<input type="text" value="123"/>	<input type="text" value="123"/>	<input type="text" value="Not since initialization"/>

DNS **FTP** **HTTP** **SMTP**

OK Cancel Help

Checking Network Health & Status: WhatsUp Professional Item Properties

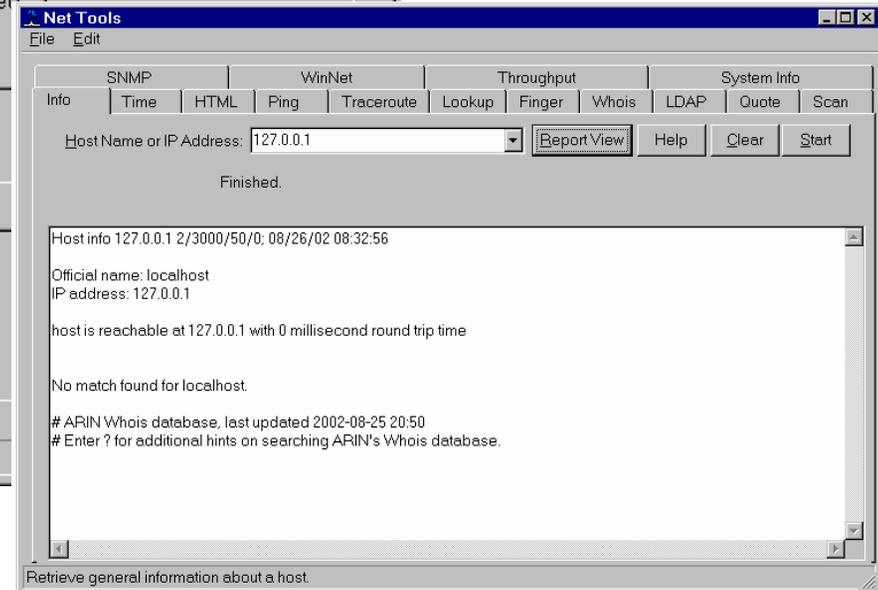
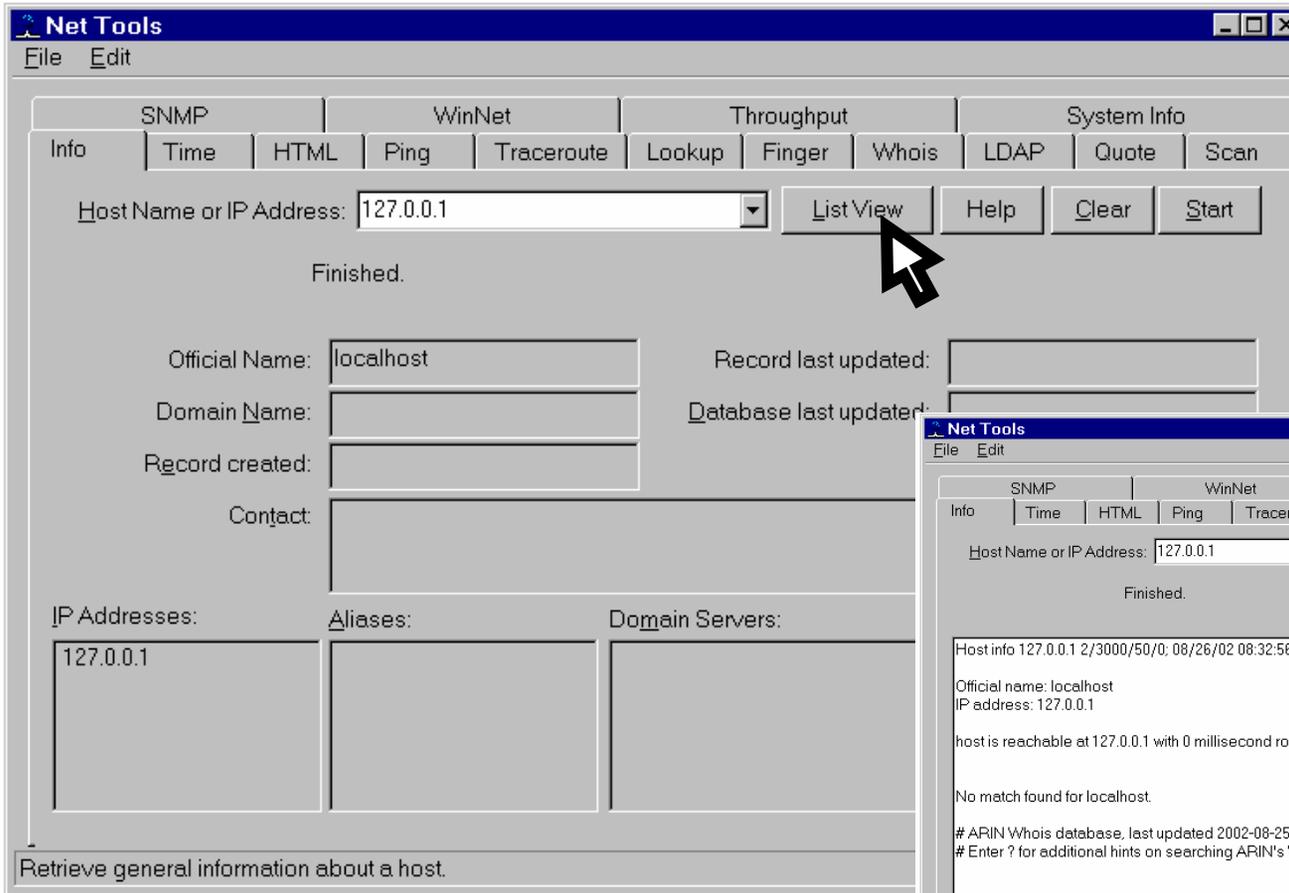


Checking Network Health & Status: WhatsUp Professional Net Tools



- **Info**
 - display a summary of device information
- **Time**
 - synchronize your computer's clock with a remote time server
- **HTML**
 - query a web address
- **Ping**
 - verify connectivity to a host
- **TraceRoute**
 - trace and view the route to an Internet host
- **Lookup**
 - query Internet domain name servers for information about hosts and name servers
- **Finger**
 - display information about users on a host
- **Whois**
 - display information about Internet domain ownership and groups
- **LDAP (Lightweight Directory Access Protocol)**
 - search directories for names and information on another computer
- **Quote**
 - view quotations from a quote server
- **Scan**
 - scan a range of IP addresses to create a network map
- **SNMP**
 - view and graph Simple Network Management Protocol (SNMP) values for a device
- **WinNet**
 - View Windows Network domains, hosts, and workstations
- **Throughput**
 - test data throughput on the connection between your computer and a remote computer
- **System Info**
 - information about your local system

Checking Network Health & Status: WhatsUp Professional Net Tools - Info



Checking Network Health & Status: WhatsUp Professional Net Tools - Ping



#	Address	bytes	ms	Status
1	120.0.0.1	52	60	Failure - Host Unreachable
2	120.0.0.1	52	190	Failure - Host Unreachable
3	120.0.0.1	52	130	Failure - Host Unreachable
4	120.0.0.1	52	0	Failure - Host Unreachable
5	120.0.0.1	52	0	Failure - Host Unreachable

Sent: 5 Received: 0 Min: 0 Max: 0 Avg: 0

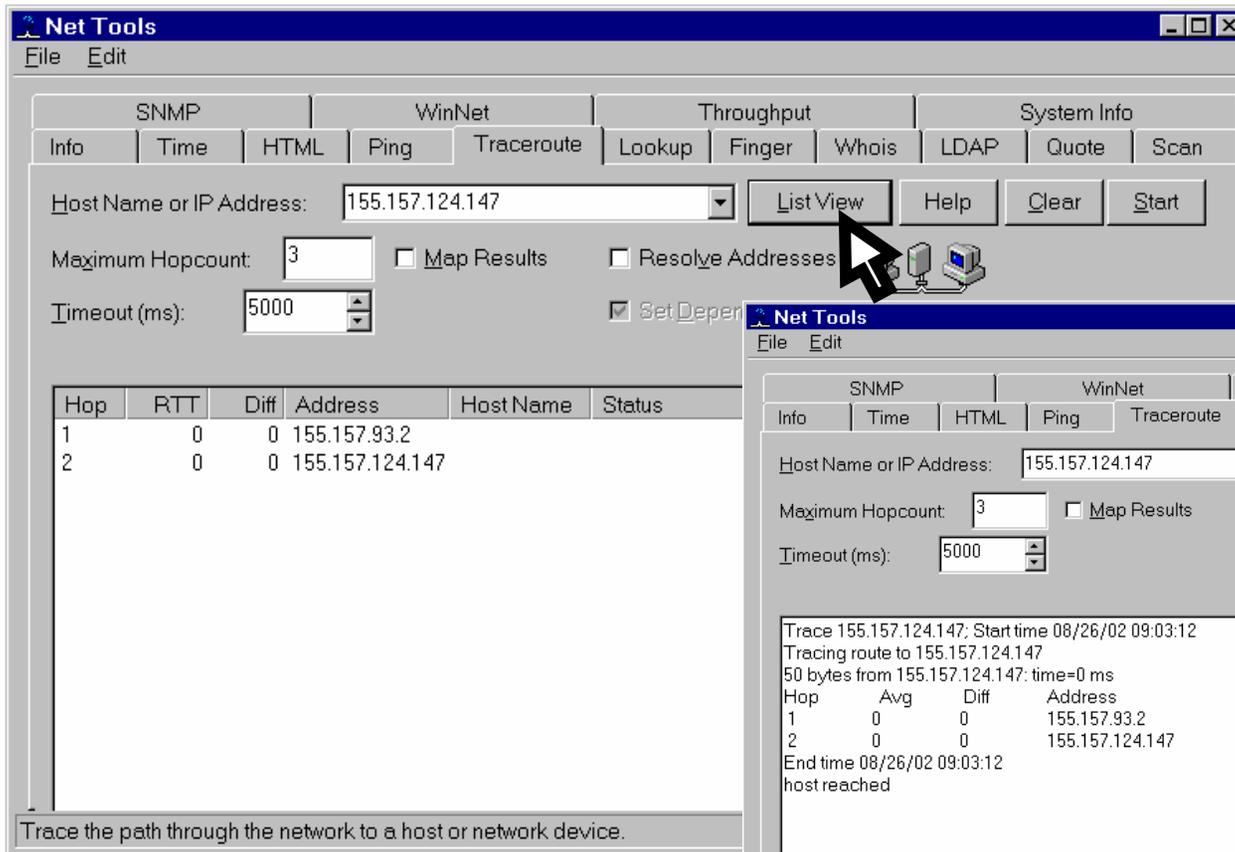
Ping is used to determine if a network device is reachable.

Sent: 5 Received: 0 Min: 0 Max: 0 Avg: 0

```
Ping 120.0.0.1 5/5000/52/1; Start time 08/26/02 08:51:27
ping 120.0.0.1 packet 1 failed, retcode = 11003 (Host Unreachable)
ping 120.0.0.1 packet 2 failed, retcode = 11003 (Host Unreachable)
ping 120.0.0.1 packet 3 failed, retcode = 11003 (Host Unreachable)
ping 120.0.0.1 packet 4 failed, retcode = 11003 (Host Unreachable)
ping 120.0.0.1 packet 5 failed, retcode = 11003 (Host Unreachable)
Sent: 5 Received: 0 Min: 0 Max: 0 Avg: 0
End time 08/26/02 08:51:33
```

Ping is used to determine if a network device is reachable.

Checking Network Health & Status: WhatsUp Professional Net Tools - Traceroute



Net Tools

File Edit

SNMP WinNet Throughput System Info

Info Time HTML Ping Traceroute Lookup Finger Whois LDAP Quote Scan

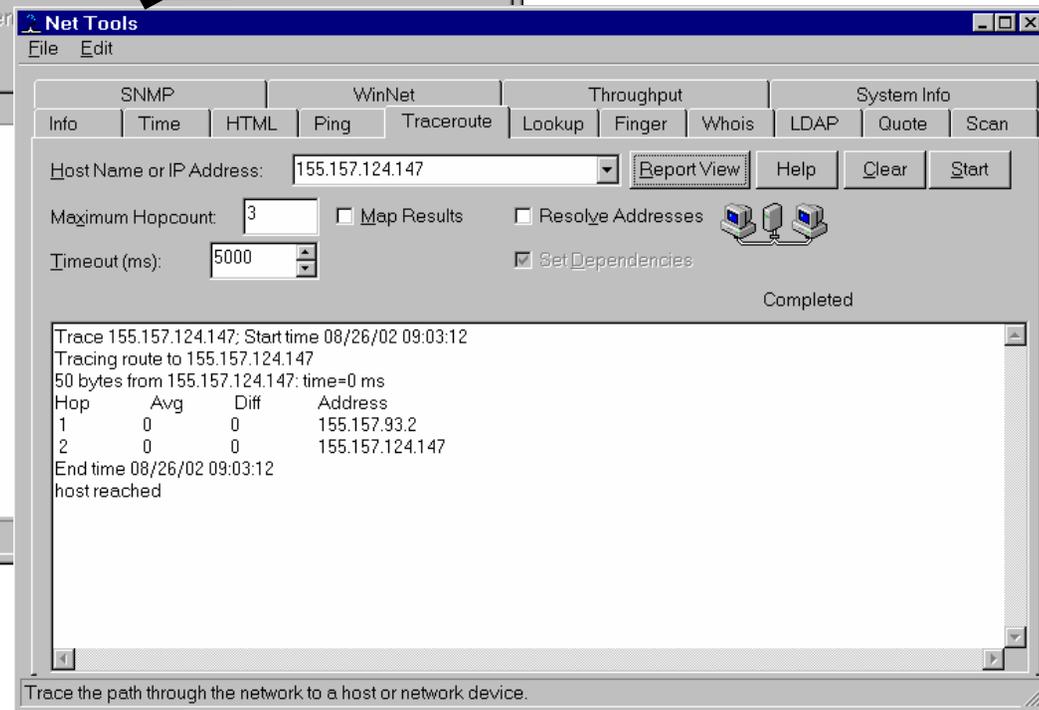
Host Name or IP Address: 155.157.124.147 List View Help Clear Start

Maximum Hopcount: 3 Map Results Resolve Addresses Set Dependencies

Timeout (ms): 5000

Hop	RTT	Diff	Address	Host Name	Status
1	0	0	155.157.93.2		
2	0	0	155.157.124.147		

Trace the path through the network to a host or network device.



Net Tools

File Edit

SNMP WinNet Throughput System Info

Info Time HTML Ping Traceroute Lookup Finger Whois LDAP Quote Scan

Host Name or IP Address: 155.157.124.147 Report View Help Clear Start

Maximum Hopcount: 3 Map Results Resolve Addresses Set Dependencies

Timeout (ms): 5000

Completed

```
Trace 155.157.124.147; Start time 08/26/02 09:03:12
Tracing route to 155.157.124.147
50 bytes from 155.157.124.147: time=0 ms
Hop      Avg      Diff     Address
1         0         0    155.157.93.2
2         0         0    155.157.124.147
End time 08/26/02 09:03:12
host reached
```

Trace the path through the network to a host or network device.

Checking Network Health & Status: WhatsUp Professional Logs



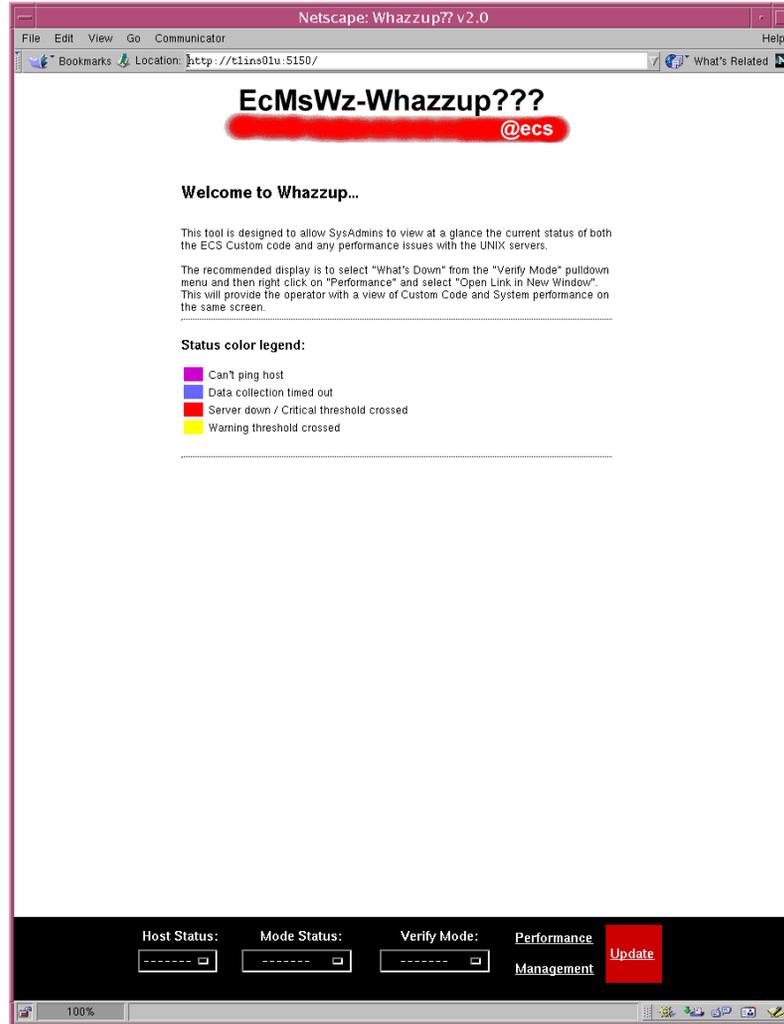
- **Reports**
 - Uses a single database to store all device information across all device groups
 - Provides a variety of reports that provide details of the nature of logged data
 - Report logs of device events, network status, state change timelines
 - provides a history of what has occurred on the network
 - associated Debug Log window permits viewing events as they occur

Checking Network Health & Status



- **Whazzup???** system management tool
 - Host and mode views of network resources and servers
 - **Status information on resources**
 - Purple: Inability to ping specified host
 - Blue: Incomplete data collection
 - Red: Server is down
 - Yellow: Warning threshold has been exceeded
 - Performance monitoring capability
- **ECS Health Check GUI**
 - Indicates status of EcDmV0ToEcsGateway and Data Pool
- **ECS Assistant and ECS Monitor**
 - Operator interface for starting servers
 - Indication of network and server status and changes
 - Associated script to ping servers

Whazzup Welcome Screen



Whazzup: Performance Stats



Netscape: Whazzup?? v2.0

File Edit View Go Communicator Help

Location: http://t1ins01u:5150/

What's Related

Performance Stats

Last Update: Oct 13, 2000 - 12:50:32 [Update]

Hostname	CPU used	Load	Swap Free	Mem Free	Most Full	Disk IO
t1acg01	2%	0.00,0.02,0.00	901824 K	2724 K	swap:31%	0/sec
t1acg04	3%	0.29,0.16,0.08	5120000 K	50708 K	swap:100%	4.0/sec
t1acs02	6%	0.04,0.04,0.05	431376 K	31432 K	66%	3/sec
t1acs03	50%	1.04,1.05,1.06	704840 K	50672 K	47%	0/sec
t1ais01	0%	0.09,0.05,0.05	200176 K	5464 K	swap:04%	0/sec
t1aag06	- %	-	- K	- K	-	-/sec
t1code1	20%	0.10,0.08,0.08	802880 K	323376 K	swap:190%	2/sec
t1dms02	2%	0.05,0.03,0.04	413672 K	10216 K	60%	0/sec
t1dps01	52%	1.09,1.07,1.07	376384 K	85176 K	56%	0/sec
t1drg01	17%	0.12,0.03,0.01	1048576 K	13164 K	swap:58%	0/sec
t1drg03	0%	1.00,1.00,1.10	4096000 K	29247 K	71%	0.0/sec
t1icg01	16%	0.29,0.11,0.02	5449856 K	45348 K	52%	0/sec
t1icg03	31%	0.09,0.13,0.17	5448960 K	29284 K	swap:100%	0.0/sec
t1ims01	0%	0.23,0.23,0.25	1177648 K	470576 K	swap:30%	0/sec
t1ims02	66%	1.41,1.30,1.23	1293176 K	139920 K	0.86%	1/sec
t1msh01	2%	0.08,0.22,0.22	12958 K	8891 K	0.93%	0/sec
t1msh08	1%	0.30,0.32,0.51	11580 K	19490 K	0.30%	0/sec
t1mss06	0%	0.09,0.04,0.04	435240 K	54000 K	swap:01%	0/sec
t1pis01	2%	0.02,0.02,0.04	691504 K	30424 K	59%	0/sec
t1pis02	4%	0.02,0.02,0.02	622840 K	70136 K	64%	32/sec
t1spg01	2%	0.01,0.00,0.00	1048576 K	54948 K	swap:32%	0/sec
t1spg03	0%	0.00,0.00,0.00	5120000 K	23537 K	31%	0.0/sec
t1sps02	6%	0.13,0.13,0.13	771832 K	9304 K	64%	1/sec
t1vtg01	1%	0.01,0.00,0.00	26101984 K	207887 K	27%	0.0/sec
t1vtg02	4%	0.00,0.00,0.00	18959672 K	47134 K	54%	0/sec

Host Status: [] Mode Status: [] Verify Mode: [] Performance Management [Update]

Whazzup: Verify Mode, What's Down



Netscape: Whazzup?? v2.0

File Edit View Go Communicator Help

Location: <http://t1ins01u:5150/> What's Related

Required Servers Currently Down...

Last Update: Oct 13, 2000 - 12:30:33 [[Update](#)]

Mode	Server	Host	UID	PID	STime	Size
OPS	EcCsRegistry	t1icg01	-	-	-	-
	EcDsStFTPClientDaemon	t1acg01	-	-	-	-
TS1	EcCsEmailParser	t1ins02	-	-	-	-
	EcCsGateway	t1ins02	-	-	-	-
	EcCsMojoGateway	t1ins02	-	-	-	-
TS2	All required servers are down					
TS3	EcDsStStagingDiskServer	t1dps01	-	-	-	-
	EclnAuto	t1icg03	-	-	-	-
	EclnGran	t1icg03	-	-	-	-
	EclnPolling	t1acg04	-	-	-	-
	EclnPolling	t1icg03	-	-	-	-
	EclnReqMgr	t1icg03	-	-	-	-
	EcPIOdMgr	t1pls01	-	-	-	-

Host Status: Mode Status: Verify Mode:

Performance [Update](#)
Management

Quick Check on Server Availability



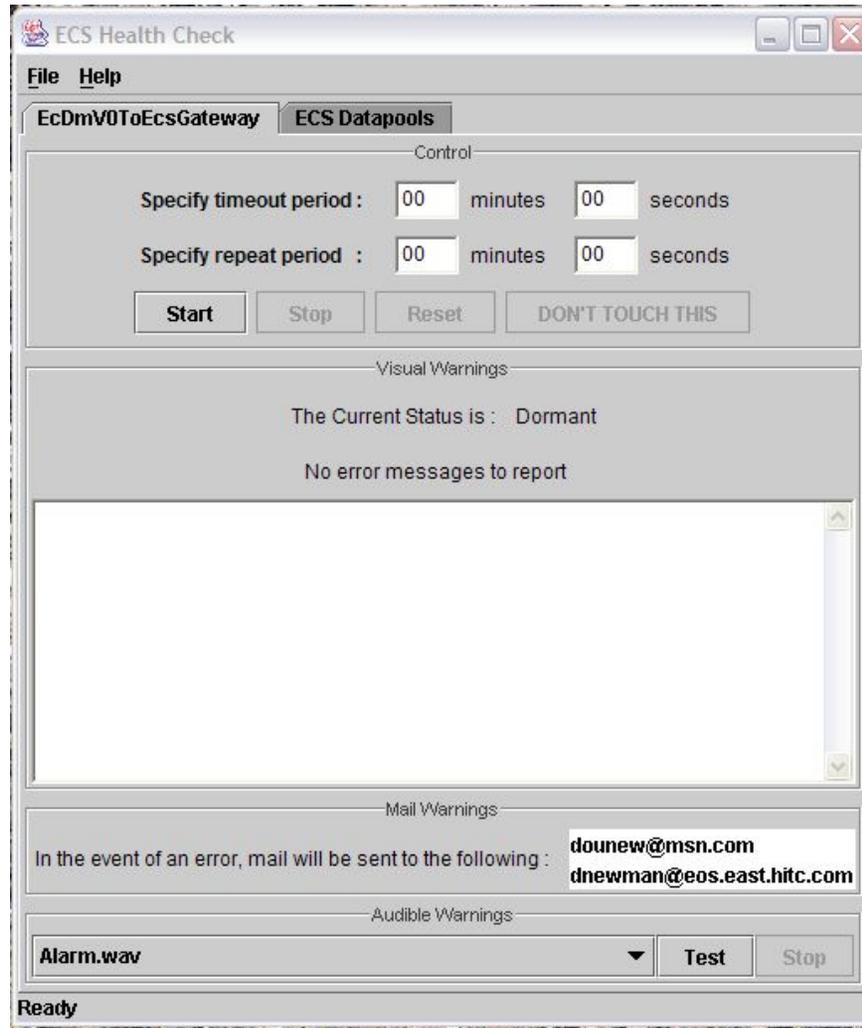
- **The Whazzup???** tool is a web-based application
- **Use a web browser for a quick check on servers**
 - **Start the tool**
 - **Select “What’s Down” from the Verify Mode pop-up menu**
 - **Servers that are down are displayed by mode**
 - **If a host is down, its entries are highlighted in purple**

ECS Health Check GUI

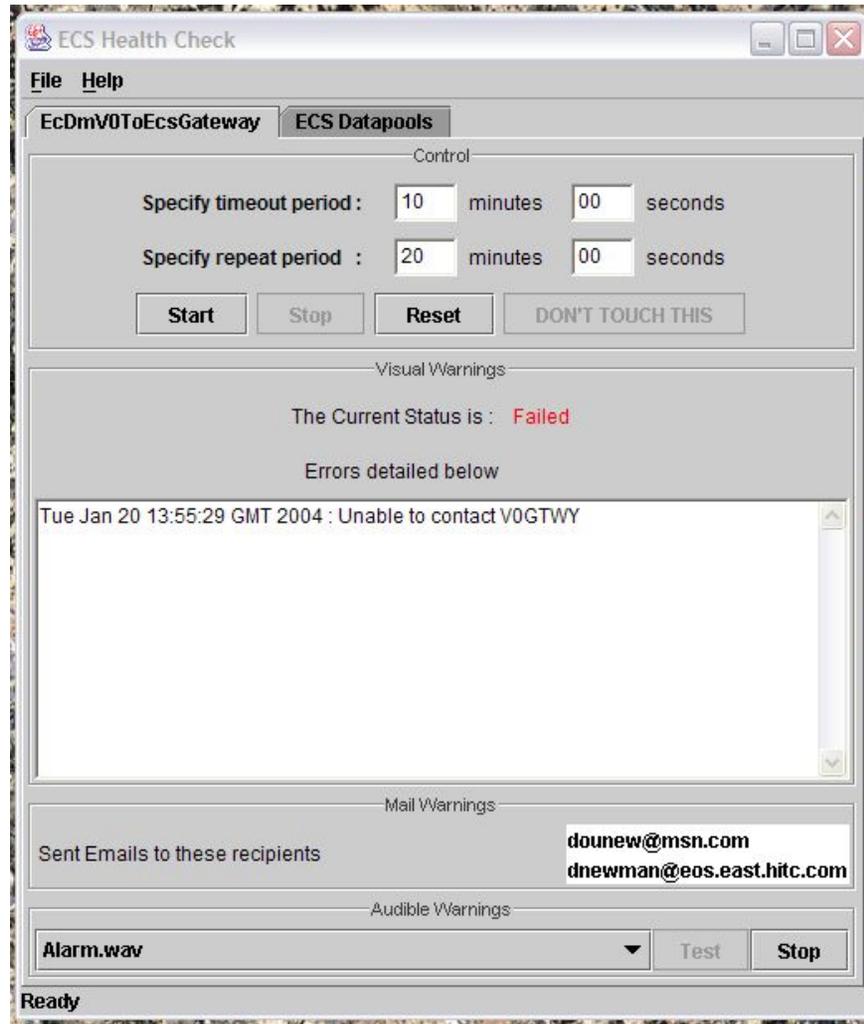


- **ECS Health Check GUI**
 - Provides status of EcDmV0ToEcsGateway and Data Pool drill-down search engine
 - At a specified rate it sends inventory searches to the EcDmV0ToEcsGateway and/or submits granule search requests to the Data Pool
 - Provides multiple warnings when a failure is registered by the GUI during the current search
 - Visual warning (including details about the time and nature of the error)
 - Audible alarm (when implemented)
 - E-mail message

ECS Health Check GUI (at Startup)



ECS Health Check GUI (Having Detected an Error)



ECS Assistant and ECS Monitor



- **ECS Assistant**
 - Independently available at each host
 - Subsystem Manager GUI permits subsystem installs and staging ESDTs and DLLs into their directories
 - ESDTs: CUSTOM/data/ESS
 - DLLs: CUSTOM/lib/ESS
- **ECS Monitor**
 - Independently available at each host
 - Display the status of servers by installed components
- **Associated script to ping servers in a mode**
 - EcCsIdPingServers <MODE>

ECS Assistant Manager Windows



The screenshot displays the ECS Assistant Manager software interface. The main window, titled "ECS ASSISTANT: Subsystem Manager", shows a tree view of subsystems (CLS, CSS, DM, DPS, DSS, INGEST, IOS, MSS, PLS, TOOLKIT, VOC) and a settings panel on the right. The settings panel includes fields for "ClearCase View", "Selected Subsystem", "Selected Component", and "Selected Application". Below the settings is an "Installation Statistics" section and a "Legend" section with color-coded indicators for "Not Installed", "Successfully Installed", "Installation Warnings", and "Installation Errors".

A smaller window titled "ECS ASSISTANT (3.1.1)" is overlaid on the left, showing a menu with options like "E. A. S. I.", "DB Viewer", "Help", and "Exit", along with user information: USER: cmts2, HOST: t1acs06, SITE: VATC, VIEW: NULL.

ECS Assistant Monitor Window

The screenshot shows the ECS Monitor application window. The title bar reads "ECS Monitor". The main area is divided into several sections. At the top, it displays "Mode: TS3" and "Subsystem: Component:". On the right, it shows "Hostname: t1p1s01" and "User Id: cmshared". Below this is a date and time display: "Thu Nov 9 15:03:53 EST 2000". A control bar contains buttons for "Exit", "Update Now", and "cdsping all servers...", along with a checked "Auto Update" checkbox. The main content area is a table with the following data:

SERVER	STATUS	PID	USERID	START TIME
EcDpPrDeletion	DOWN			
EcDpPrJobMgmt	DOWN			
EcP10dMgr	UP	23493	cmshared	2000/11/08 17:38:51
EcP1SubMgr	UP	18500	cmshared	2000/11/07 15:36:44

Analysis/Troubleshooting: System



- **COTS product alerts and warnings**
 - (e.g., WhatsUp Professional, AutoSys/Job Management Web Interface)
- **COTS product error messages and event logs**
 - (e.g., AutoSys)
- **Custom Software Error Messages**
 - Listed in 609-EMD-001

Systematic Troubleshooting



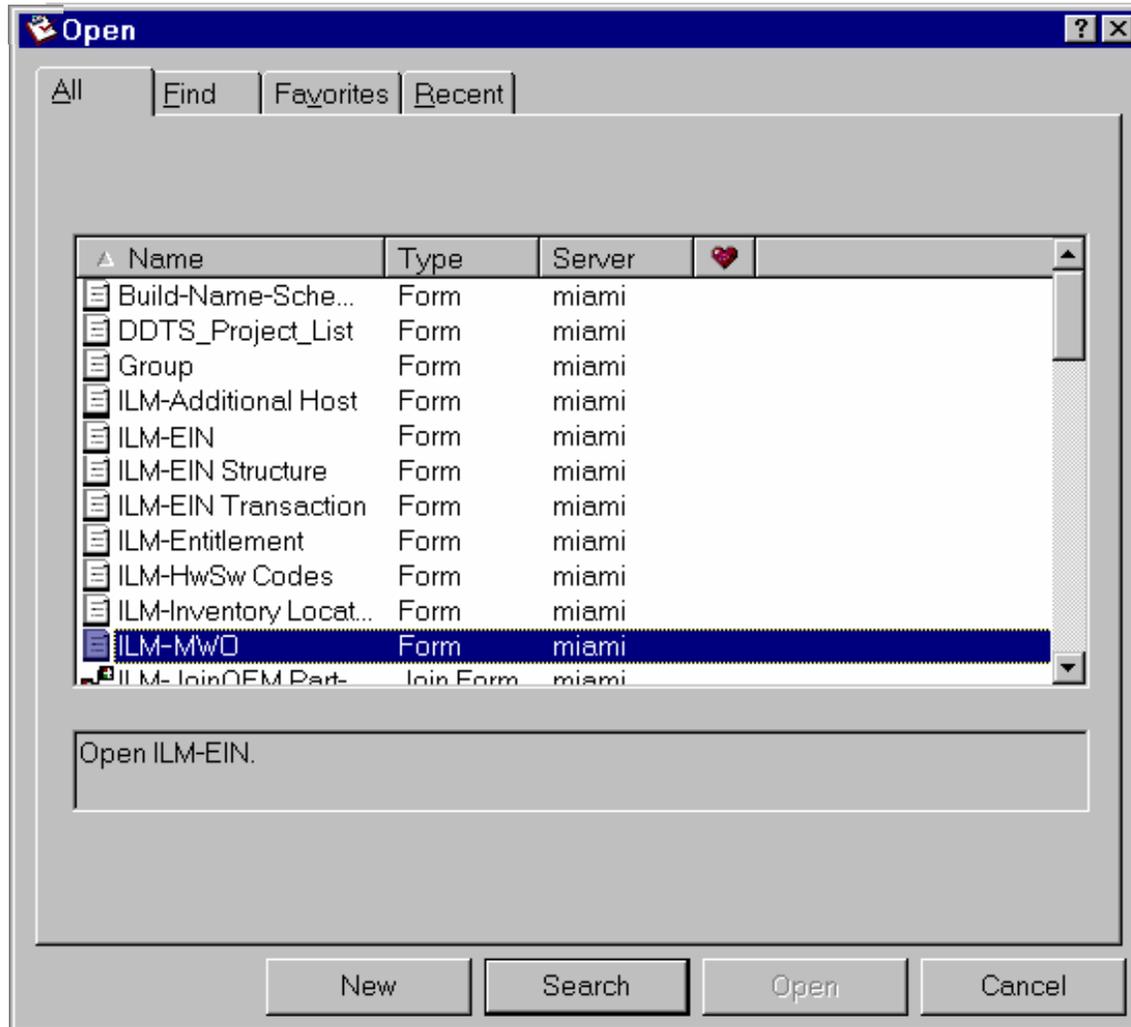
- **Thorough documentation of the problem**
 - Date/time of problem occurrence
 - Hardware/software
 - Initiating conditions
 - Symptoms, including log entries and messages on GUIs
- **Verification**
 - Identify/review relevant publications (e.g., COTS product manuals, system tools and procedures manuals)
 - Replicate problem
- **Identification**
 - Review product/subsystem logs
 - Review system error messages
- **Analysis**
 - Detailed event review (e.g., WhatsUp Professional event log, server logs)
 - Troubleshooting procedures
 - Determination of cause/action

Analysis/Troubleshooting: Hardware



- **System hardware is COTS**
- **System troubleshooting principles apply**
- **Whazzup???** for quick assessment of status
- **Server logs for event sequence**
- **Initial troubleshooting**
 - Review error message against hardware operator manual
 - Verify connections (power, network, interface cables)
 - Run internal systems and/or network diagnostics
 - Review system logs for evidence of previous problems
 - Attempt system reboot
 - If problem is hardware, report it to the DAAC Maintenance Coordinator, who prepares a maintenance Work Order using ILM software

Remedy OPEN Dialog for ILM Access



ILM Work Order Entry Screen



Remedy User - [ILM-MWO (New)]

File Edit View Tools Actions Window Help

New ILM-MWO

Work Order No MWO Status Priority

Parent Information

Parent EIN ECS Name

Part No MFR

Description

System Serial No Location Room

Failure and Vendor Contact | ALDT Info | Total Down Time (HRS)

Notification Date-Time Failure Date-Time

Vendor Call Date-Time Vendor Initial Resp Date-Time

Brief Description

Long Description

Vendor Arrive Date-Time Vendor Complete Date-Time

Vendor Contact Name Vendor Reference

Failed & Replacement Components

Sequence	Component EIN	Serial No	Description	Event Type	Main Code	Processed?
Click to Refresh						

Add Fail-Replacement Component

Process MWO Line Item

Ready | ttran | miami

Failure and Vendor Contact | ALDT Info | Total Down Time (HRS)

ALDT1

ALDT Start Date-Time ALDT End Date-Time

ALDT Reason

ALDT2

ALDT Start Date-Time ALDT End Date-Time

ALDT2 Reason

Failure and Vendor Contact | ALDT Info | Total Down Time (HRS)

Total ALDT

Time to Repair

Switchover Time

Total Chargeable Down Time

Submitter

Create Date

Last Modified By

ILM-MWO Line Item Form



Remedy User - [ILM-MWO Line Item (New)]

File Edit View Tools Actions Window Help

New ILM-MWO Line Item Save

Work Order No Parent EIN MWO Status

Sequence Component EIN

Database Values

Part No

Description

MFR Mod-Ver

Serial No

PO Number Vendor ID

Item Status GFE Num

Observed Values

Part No

Description

MFR Mod-Ver

Serial No

PO Number Vendor ID

Hw-Sw Code GFE Num

Maintenance Activities

Event Type Maint Code Change Date Processed?

Comment

New and Relocation Items

Replacement's EIN New Parent EIN

New Location New Building New Room

Submitter Create Date Last Modified By

Ready | Ittran | miami

Hardware Problems: (Continued)



- **Difficult problems may require team attack by Maintenance Coordinator, System Administrator, and Network Administrator:**
 - **specific troubleshooting procedures described in COTS hardware manuals**
 - **non-replacement intervention (e.g., adjustment)**
 - **replace hardware with maintenance spare**
 - **locally purchased (non-stocked) item**
 - **installed spares (e.g., RAID storage, power supplies, network cards, tape drives)**

Hardware Problems: (Continued)



- **If no resolution with local staff, maintenance support contractor may be called**
 - **Update ILM maintenance record by creating a Maintenance Work Order with problem data, support provider data**
 - **Call technical support center**
 - **Facilitate site access by the technician**
 - **Update ILM record with data on the service call**
 - **If a part is replaced, additional data for ILM record**
 - **Part number of new item**
 - **Serial numbers (new and old)**
 - **Equipment Identification Number (EIN) of new item**
 - **Model number (Note: may require CCR)**
 - **Name of item replaced**

ILM Work Order Modification



- **Completion of Maintenance Work Order Entry copies active children of parent EIN into the work order**
- **Modify the Maintenance Work Order to enter down times, and vendor times and notes**
- **From Maintenance Work Order screen, ILM-MWO Line Items form is used to record details**
 - **Which item (or items) failed**
 - **New replacement items**
 - **Notes concerning the failure**

Non-Standard Hardware Support



- **For especially difficult cases, or if technical support is unsatisfactory**
 - **Escalation of the problem**
 - Request escalation from the on-site maintenance technician
 - If further escalation is necessary, the local maintenance coordinator can request the ILS office to escalate the issue within the original equipment manufacturer vendor's system

Preventive Maintenance



- **Elements that may require PM are the STK robot, tape drives, stackers, printers**
 - **Scheduled by local Maintenance Coordinator**
 - **Coordinated with maintenance organization and using organization**
 - **Scheduled to be performed by maintenance organization and to coincide with any corrective maintenance if possible**
 - **Scheduled to minimize operational impact**
 - **Documented using ILM Preventive Maintenance record**

Troubleshooting COTS Software



- **Issues**
 - Right to use COTS software products licenses
 - Obtaining vendor telephone support
 - Obtaining vendors on-line and email support
 - Obtaining software patches and upgrades
- **Vendor support contracts**
 - One or more years contracted - extended or modified as operationally required
 - Related contract info maintained on the ILS web page
 - Contact ILS Support
 - Telephone: 1-800-ECS-DATA (327-3282)
Option #3, Ext. 0726

COTS Software Licenses



- **Maintained in a property database by EMD ILS COTS SW License Administrator**
 - **Licenses vary by type of software and vendor policy**
 - **License Administrator maintains**
 - **Master copies of licenses and/or license keys and SW renewals**
 - **License database**
 - **Copies of software for installation at sites**
 - **COTS SW vendor support contacts information**
 - **Maintenance support for all COTS SW in use**

COTS Software Installation



- **COTS software is installed with any needed customization**
- **Final Version Description Document (VDD) available**
- **Any residual media and commercial documentation should be protected (e.g., stored in locked cabinet, with access controlled by on-duty Operations Coordinator)**

COTS Software Support



- **Systematic initial troubleshooting**
 - Examine server logs to review event sequence
 - Review error messages, prepare Trouble Ticket (TT)
 - Review system logs for previous occurrences
 - Attempt software reload
 - Report to Maintenance Coordinator (forward TT)
- **Additional troubleshooting**
 - Procedures in COTS manuals
 - Vendor site on World Wide Web
 - Software diagnostics
 - Local procedures
 - Adjustment of tunable parameters

COTS Software Support (Cont.)



- **Organize available data, update TT**
 - Locate contact information for software vendor technical support center/help desk (telephone number, name, authorization code)
- **Contact technical support center/help desk**
 - Provide background data
 - Obtain case reference number
 - Update TT
 - Notify originator of the problem that help is initiated
- **Coordinate with vendor and CM, update TT**
 - Work with technical support center/help desk (e.g., troubleshooting, patch, work-around)
 - CCB authorization required for patch

COTS Software Support (Cont.)



- **Escalation may be required, e.g., if there is:**
 - **Lack of timely solution**
 - **Unsatisfactory performance of technical support center/help desk**
- **Notify EMD Project Staff**
 - **Senior Systems Engineers**
 - **ILS Logistics Engineer coordination for escalation within vendor organization**

Troubleshooting of Custom Software



- **Code maintained at ECS Development Facility**
- **ClearCase® for library storage and maintenance**
- **Sources of maintenance changes**
 - **EMD CCB directives**
 - **Site-level CCB directives**
 - **Developer modifications or upgrades**
 - **Trouble Tickets**

Implementation of Modifications



- **Responsible Engineer (RE) selected by each EMD organization**
- **EMD system RE establishes set of CCRs for build**
- **Site/Center RE determines site-unique extensions**
- **System and center REs establish schedules for implementation, integration, and test**
- **CM maintains CCR lists and schedule**
- **CM maintains VDD**
- **RE or team for CCR at EDF obtains source code/files, implements change, performs programmer testing, updates documentation**

Custom Software Support



- **Science software maintenance not responsibility of EMD on-site maintenance engineers**
- **Sources of Trouble Tickets for custom software**
 - **Anomalies**
 - **Apparent incorrect execution by software**
 - **Inefficiencies**
 - **Sub-optimal use of system resources**
 - **TTs may be submitted by users, operators, customers, analysts, maintenance personnel, management**
 - **TTs capture supporting information and data on problem**

Custom Software Support (Cont.)



- **Troubleshooting is ad hoc, but systematic**
 - **Site report and Trouble Ticket (TT)**
 - **Referral to DAAC Help Desk and System Operational Support**
 - **Problem Review Board at the Development Facility**
- **For problem caused by non-ECS element, TT and data are provided to maintainer at that element**

General System Troubleshooting



(Note: Lesson Guide has introduction and flow charts, followed by specific procedures)

- **Source of problem likely to be specific operations; first chart provides entry to appropriate flow chart**
- **Top-level chart provides entry into troubleshooting flow charts and procedures**
- **Flow charts for problems in basic operational capabilities:**
 - **Host and Server status checks**
 - **Connectivity**
 - **Database access**
 - **File access**
 - **Registering subscriptions**

General System Troubleshooting (Cont.)



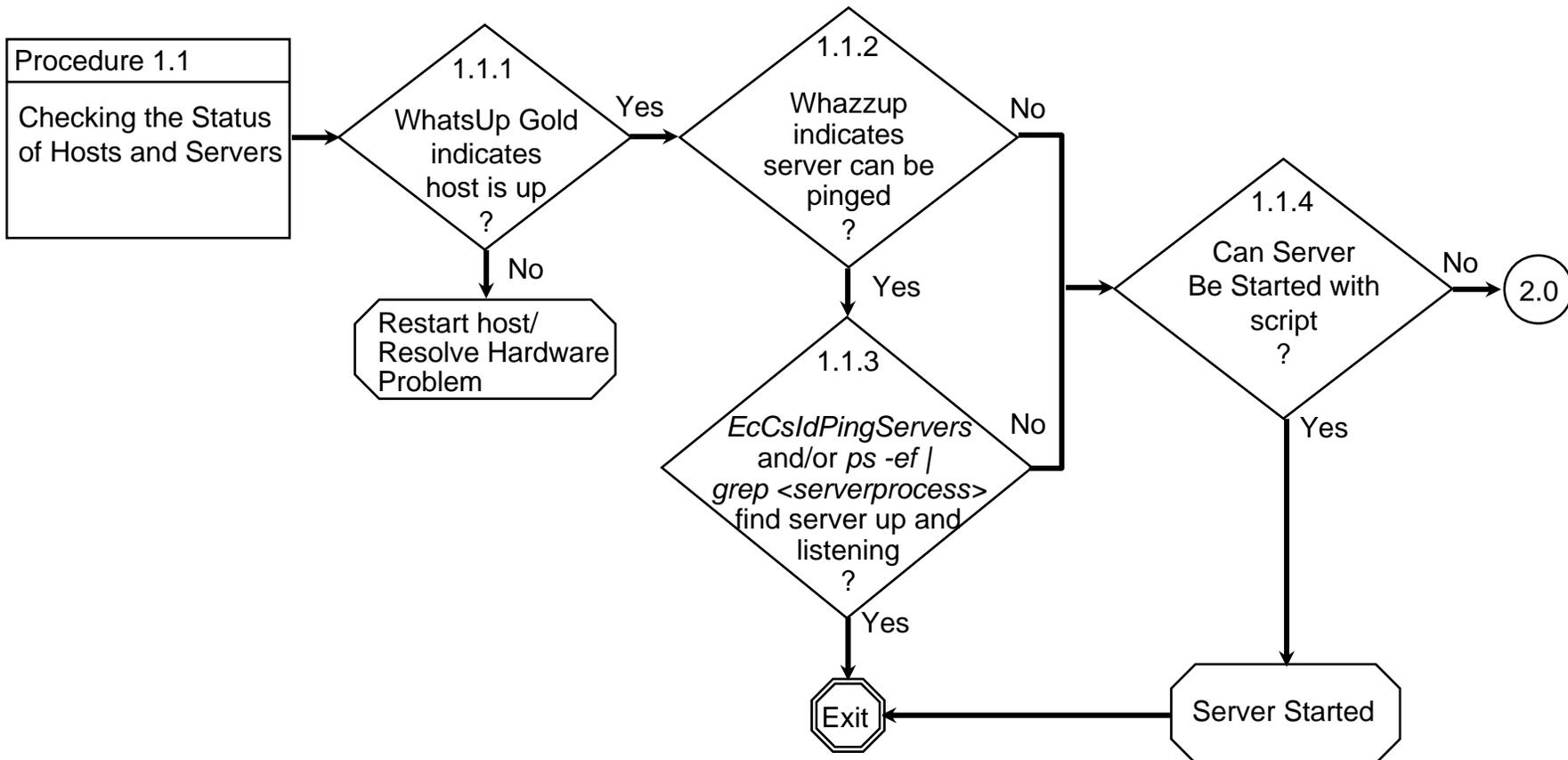
- **Flow charts for problems with basic capabilities (Cont.)**
 - Granule insertion and storage of associated metadata
 - Acquiring data from the archive
 - Ingest functions
 - PGE registration, Production Request creation, creation and activation of a Production Plan
 - Quality Assessment
 - ESDTs installed and collections mapped, insertion and acquiring of a Delivered Algorithm Package (DAP), and SSI&T functions
 - Data search and order
 - Data Pool insert and access
 - Data distribution, including FtpPush and FtpPull
 - (LP DAAC only) Functions associated with Data Acquisition Request
 - (LP DAAC only) Functions associated with On-Demand Production Requests

Troubleshooting: Top-Level Problem Categories



1.0 Host and Server Status Checks See Procedure 1.1	2.0 Checking Server Log Files See Procedure 2.1	3.0 Connectivity Problems See Procedure 3.1	4.0 Database Access Problems See Procedure 4.1	5.0 File Access Problems See Procedure 5.1
6.0 Subscription Problems See Procedure 6.1	7.0 Granule Insertion Problems See Procedure 7.1	8.0 Acquire Problems See Procedure 8.1	9.0 Ingest Problems See Procedure 9.1	10.0 Planning and Data Processing Problems See Procedure 10.1
11.0 Quality Assessment Problems See Procedure 11.1	12.0 Problems with ESDTs, DAP Insertion, SSI&T See Procedure 12.1	13.0 Problems with Data Search and Order See Procedure 13.1	14.0 Problems with Data Pool See Procedure 14.1	15.0 Data Distribution Problems See Procedure 15.1
16.0 Problems with Submission of an ASTER Data Acquisition Request (LP DAAC) See Procedure 16.1	17.0 Problems with On-Demand Production Requests (LP DAAC) See Procedure 17.1			

1.0: Host and Server Status Checks

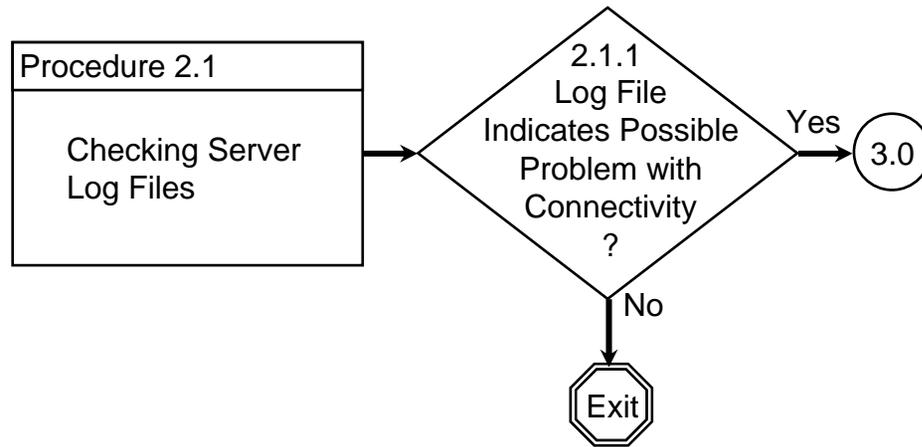


Checking Server Status



- **System functions depend on the involved software servers being in an “up” status and listening**
- **Basic first check in troubleshooting a problem is typically to ensure that the necessary hosts and servers are up and listening**
- **WhatsUp Professional and Whazzup???** provide real-time, dynamically updated displays of server and system status
- **ECS Monitor can also provide server status; an associated script, *EcCslDPingServers*, checks ability to connect to servers and clients**
- **Scripts provide the capability to start and stop servers; available scripts may start an individual server or multiple servers (e.g., servers in a mode)**

2.0: Checking Server Log Files

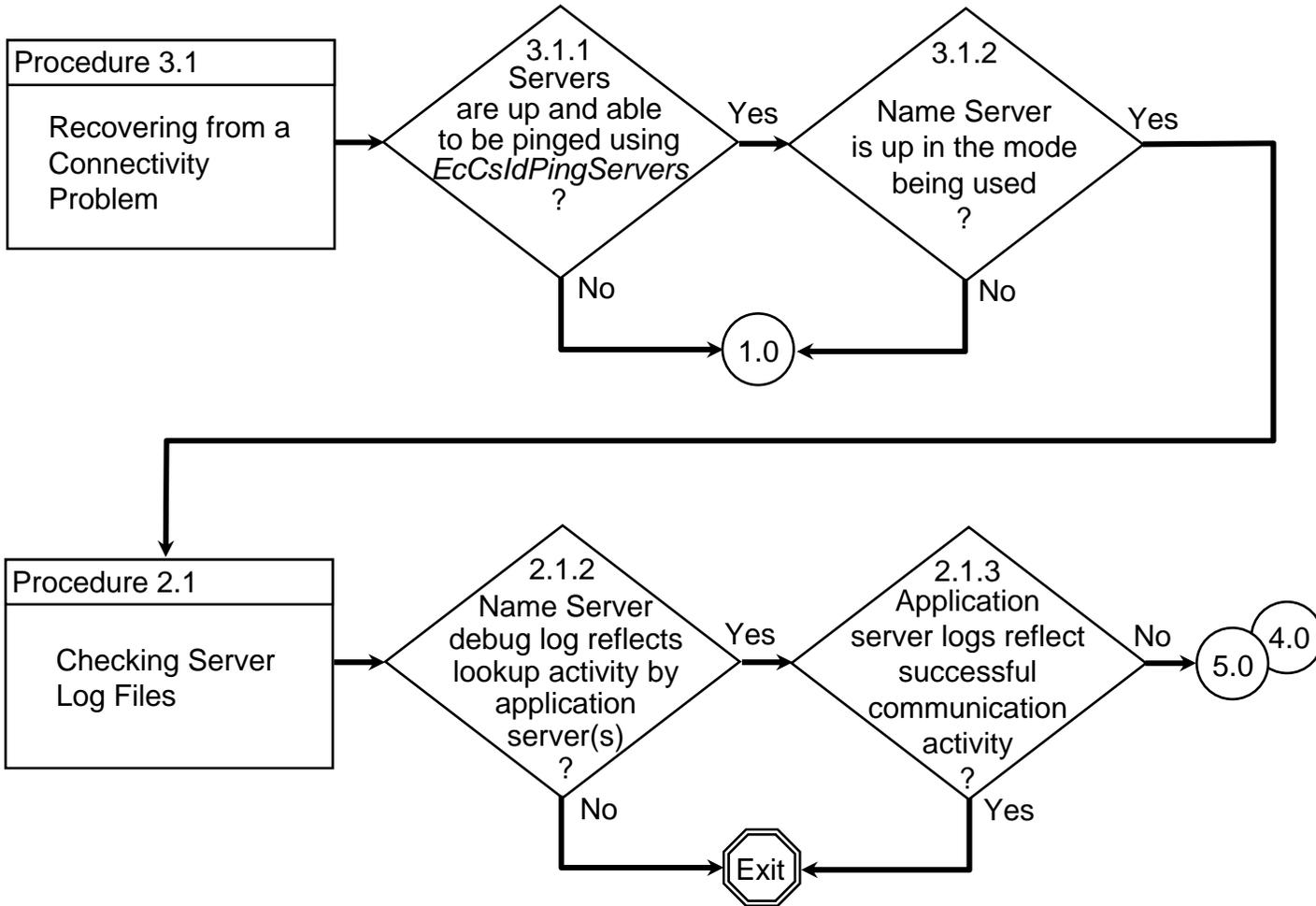


Checking Server Log Files



- **Log files: Information on possible sources of disruption in communications, server function, and many other potential trouble areas**
- **Two log files for a server**
 - **.ALOG: application log captures events, with level of detail dependent on AppLogLevel parameter setting (setting of 0 provides full trace, 1 provides messages for major events, 2 gives records of errors, 3 turns log off)**
 - **Debug.log: log captures detailed debug data, with level of detail dependent on DebugLevel parameter setting (setting of 3 provides full trace, 2 provides major events, 1 captures status and related errors, 0 turns log off; bitmasks for level 7 and 15 provide STMGT debugging)**
 - **May need to run utility EcLgLogCtrlStart to change from default debug-level setting**
- **Other logs (e.g., .err logs for processing, script logs; note especially STMGT Request Manager logs)**

3.0: Connectivity Problems



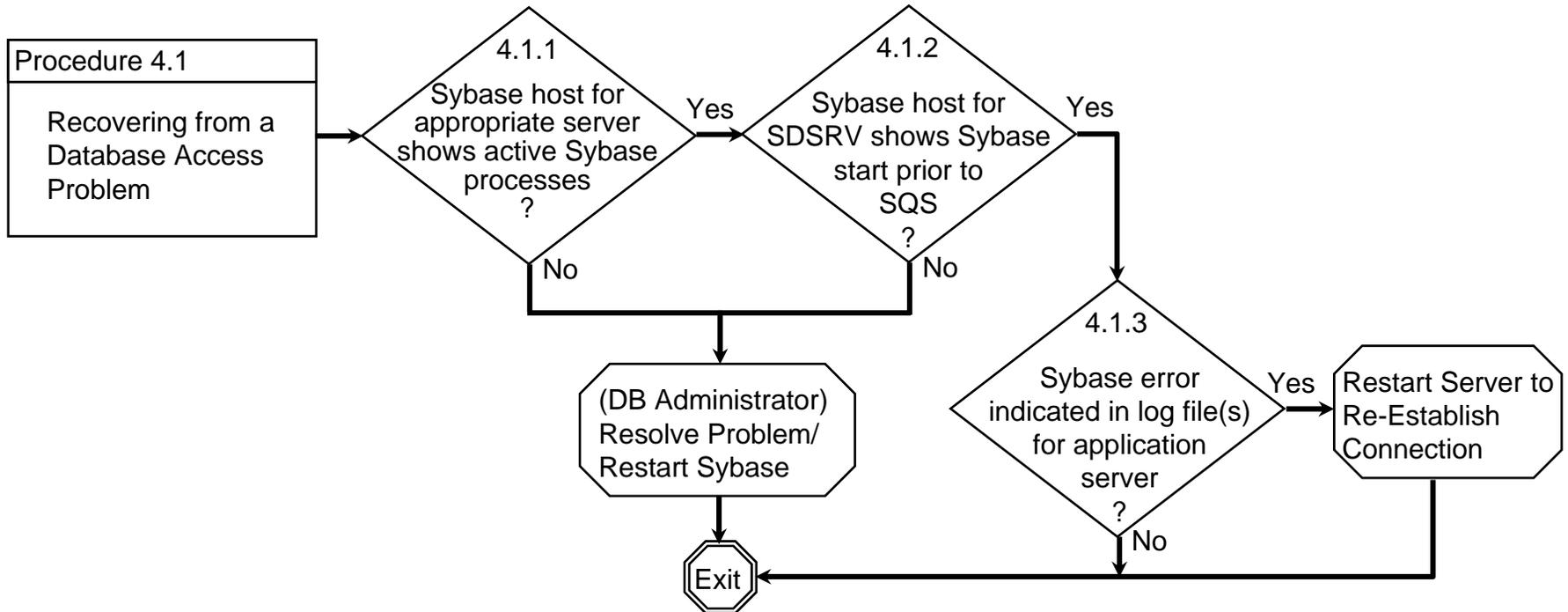
Connectivity Problems



- **The system depends on communications across multiple platforms on the network**
- **Review of server log files may point the way**
 - Both the called server and the calling server
- **Ensure servers are up**
 - Application servers and Name Server
 - EcCslIdPingServers
- **Application servers communicate with Name Server to look up location data to support connection -- see *EcCslIdNameServerDebug.log***
- **Application server logs reflect communication activity**



4.0: Database Access Problems

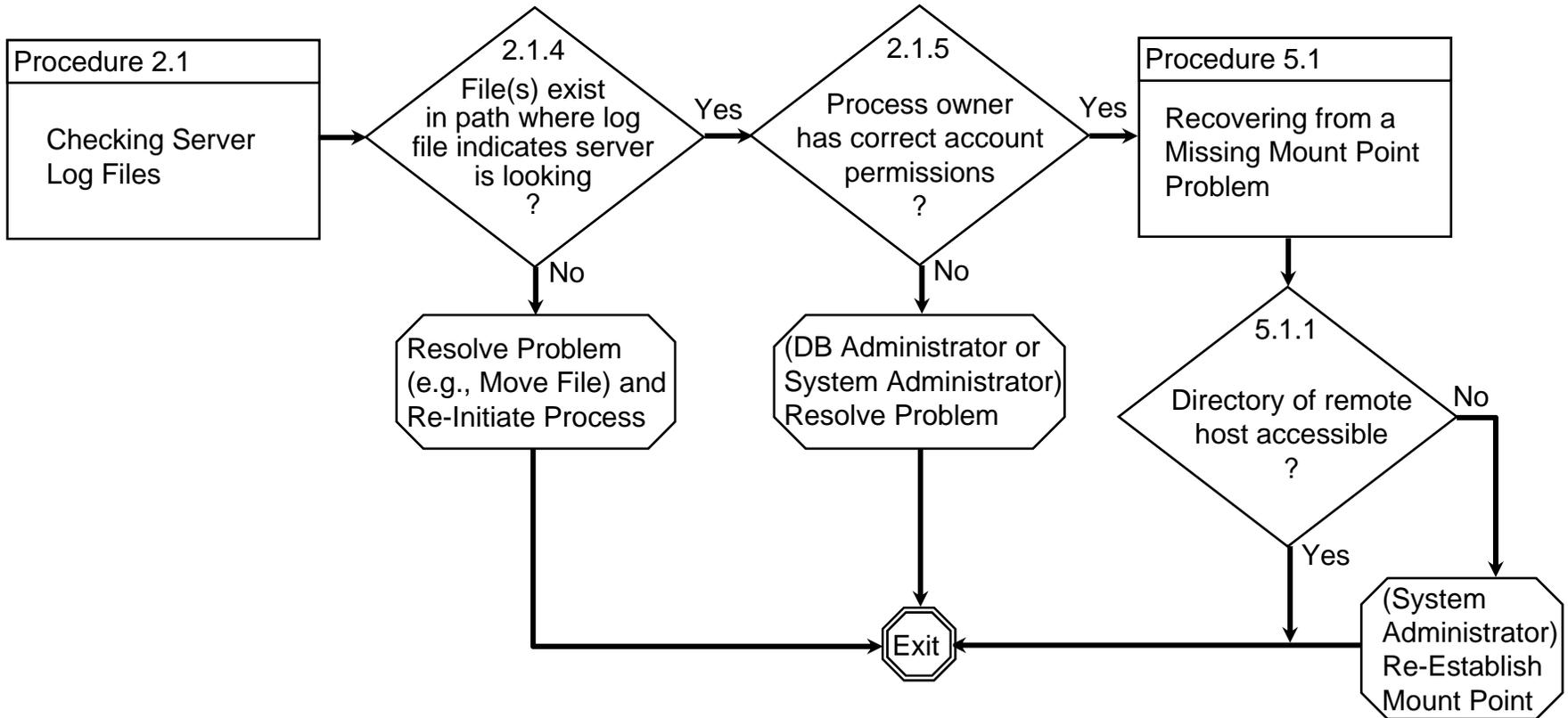


Database Access Problems



- Most system data stores use the Sybase database engine
- Sybase hosts listed in Document 920-TDx-009 (x = E for LP DAAC, = G for GSFC, = L for LaRC, = N for NSIDC)
- On Sybase host, *ps -ef | grep dataserver* and *ps -ef | grep sqs* to check that SQS was started after Sybase dataserver processes (*Note*: This applies only to host for SDSRV database)
- On application host, *grep Sybase <logfile>* to check for Sybase errors

5.0: File Access Problems

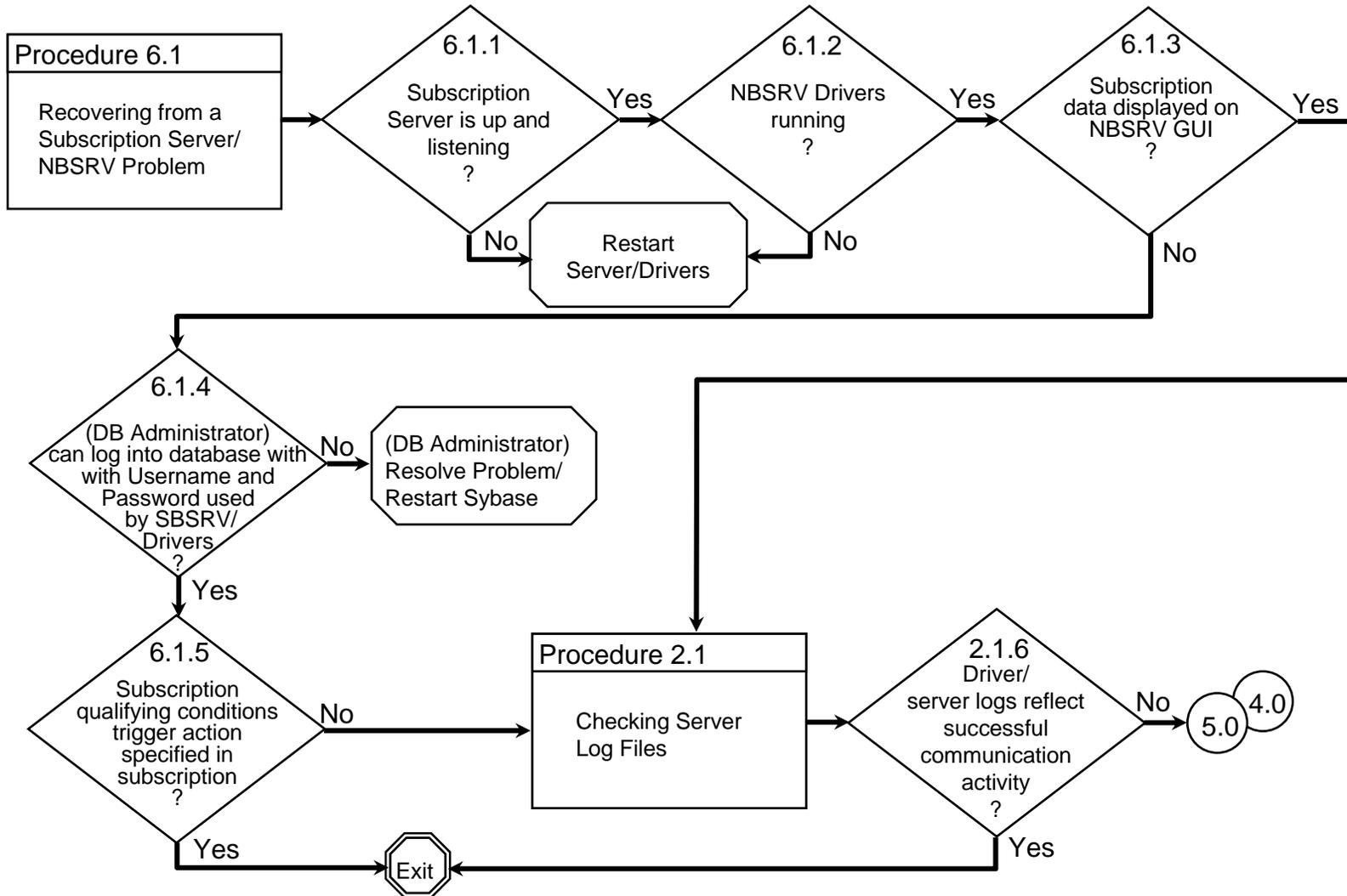


File Access/Mount Point Problems



- The system depends on remote access to files
- Ensure file is present in path where a client is seeking it
- Ensure correct file permissions
- Check for lost mount point and re-establish if necessary

6.0: Subscription Problems

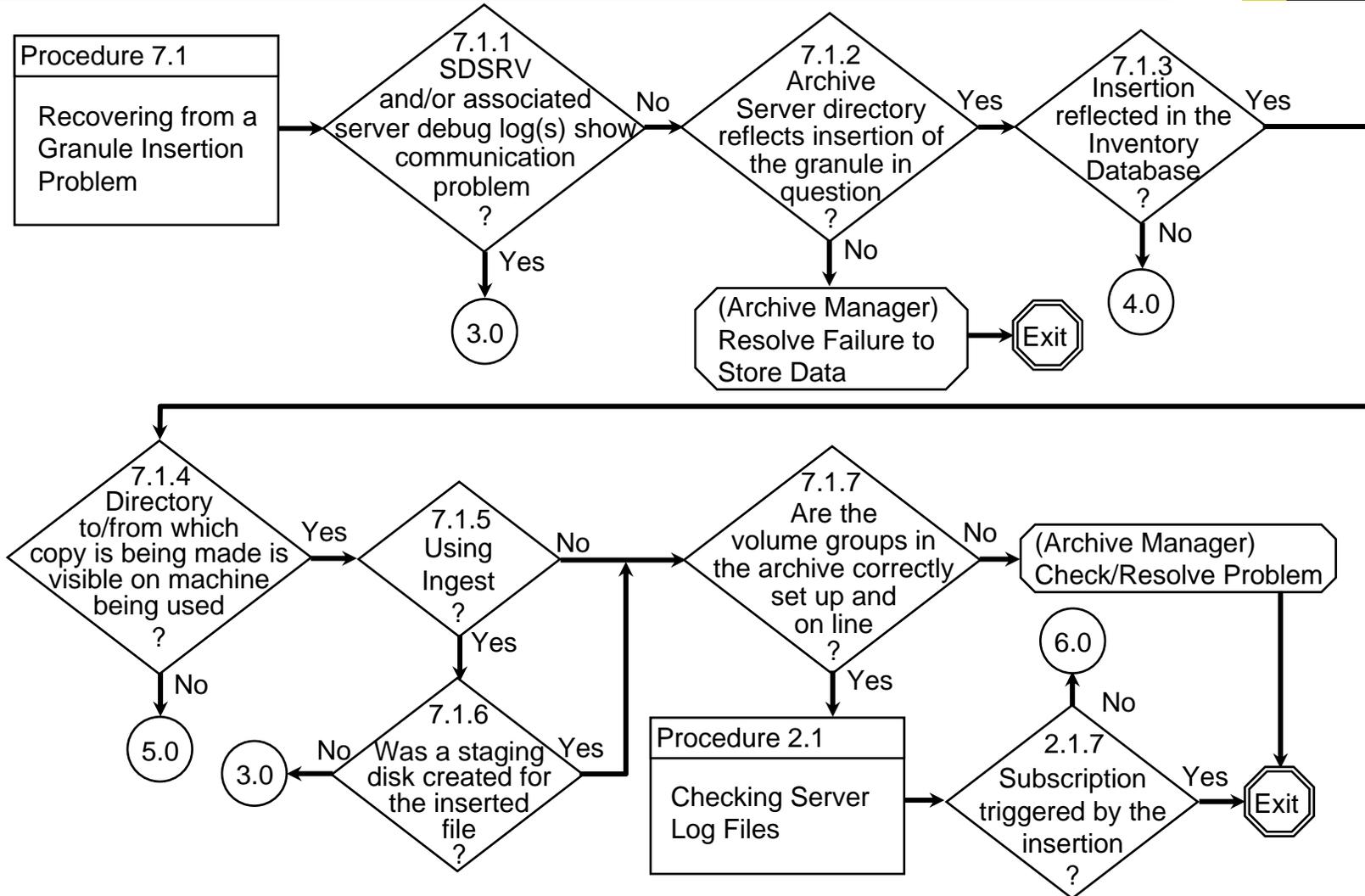


SBSRV/NBSRV Problem



- **SBSRV plays key role in Planning and Data Processing functions**
- **NBSRV is key to handling of standing requests from users for notification and/or distribution of data**
- **Ensure SBSRV is up and listening, and that NBSRV drivers are running**
- **Use NBSRV GUI to add a subscription for FtpPush of a small data file, and view the result**
- **Have Database Administrator attempt to log in to Sybase (on the NBSRV and SBSRV database hosts with the appropriate Sybase username and password)**
- **Check logs for SBSRV or NBSRV drivers**

7.0: Granule Insertion Problems

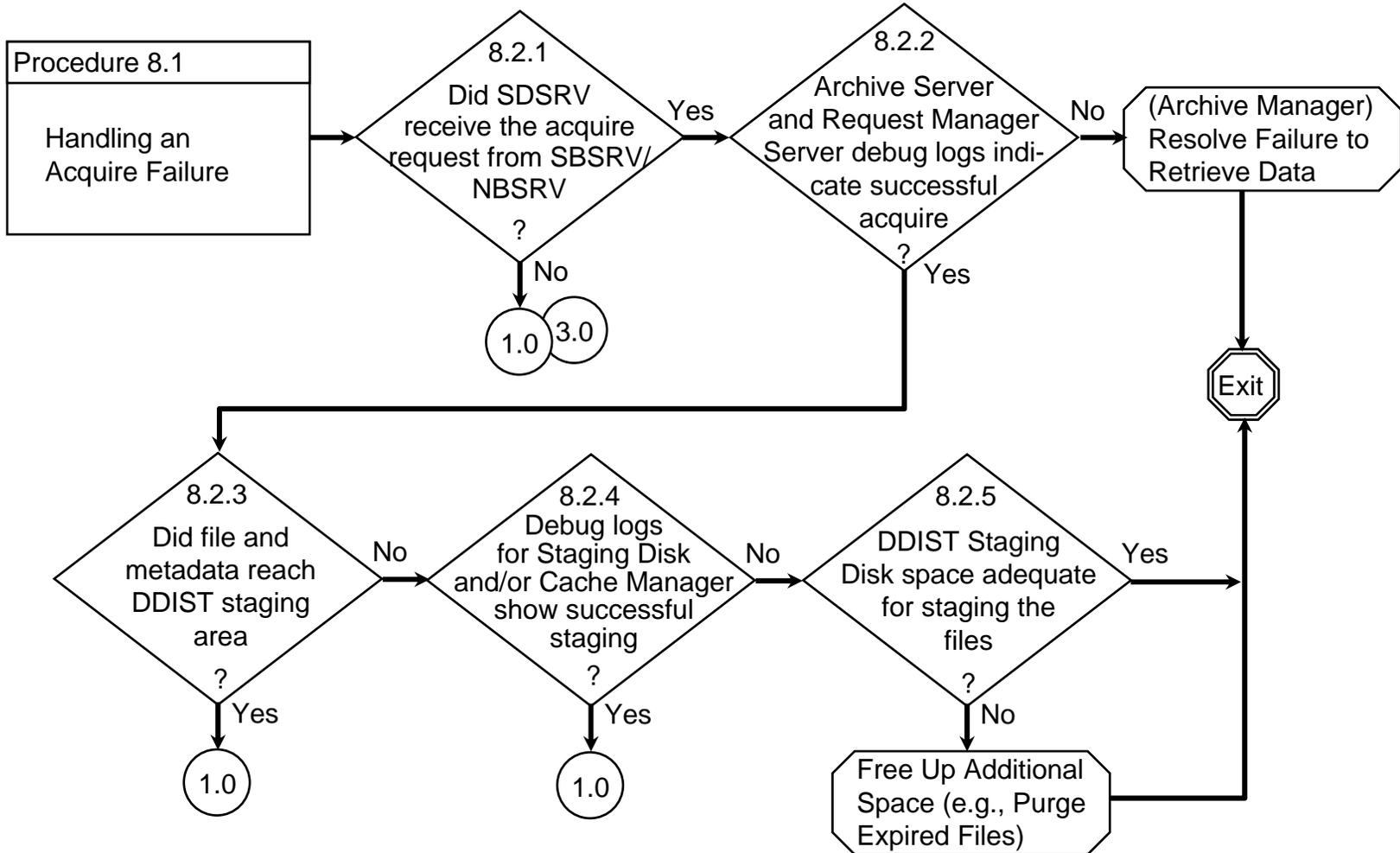


Granule Insertion Problems



- The system depends on successful archiving functions
- Check server logs (SDSRV, Archive Server, Request Manager Server) for communications errors
- Run Check Archive Script for consistency between Archive and Inventory
- List files in Archive to check for file insertion (`/dss_stk1/<MODE>/<data_type_directory>`)
- Database Administrator check SDSRV Inventory database for file entry
- Check mount points on Archive and SDSRV hosts
- If dealing with Ingest, check for staging disk in *drp*- or *icl*-mounted staging directory
- Archive Manager check volume group set-up and status
- Check SDSRV and SBSRV logs to ensure that subscription was triggered by the insertion

8.0: Acquire Problems

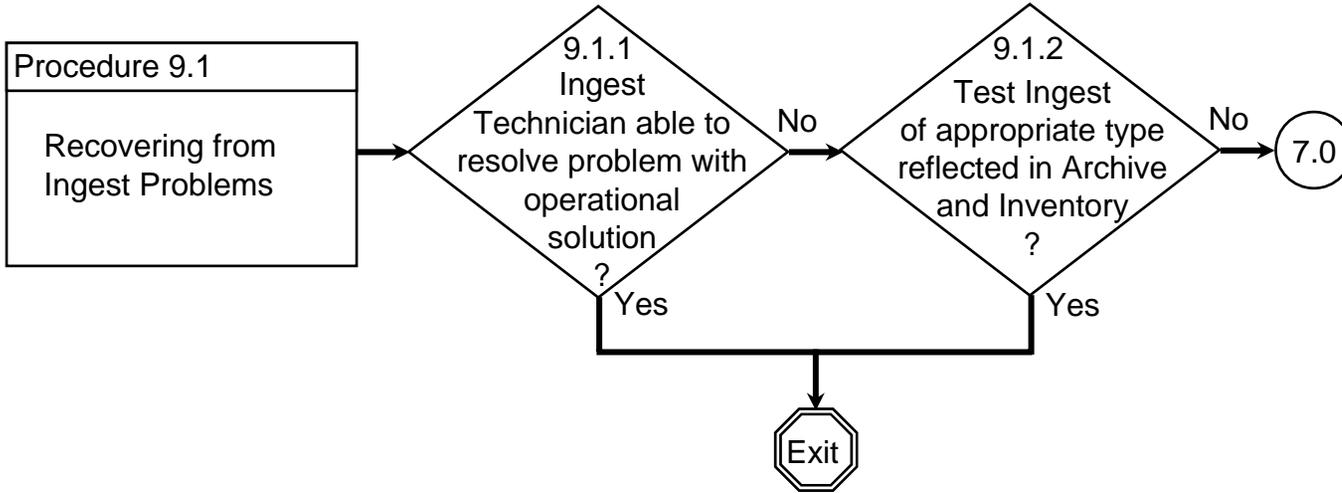


Acquire Problems



- **Functions requiring stored data are dependent on capability to acquire data from the Archive**
- **Check SDSRV GUI for Acquire request from SBSRV/NBSRV**
- **Check DDIST log for sending of e-mail notification to user**
- **Check for Acquire failure**
 - **Check SDSRV GUI for receipt of Acquire request**
 - **Check SDSRV logs for Acquire activity**
 - **Check Archive Server log for Acquire activity and Request Manager Server log for handling of the request**
 - **Check DDIST staging area for file and metadata**
 - **Check Staging Disk log for Acquire activity errors**
 - **Check staging area space available on the DDIST server**

9.0: Ingest Problems

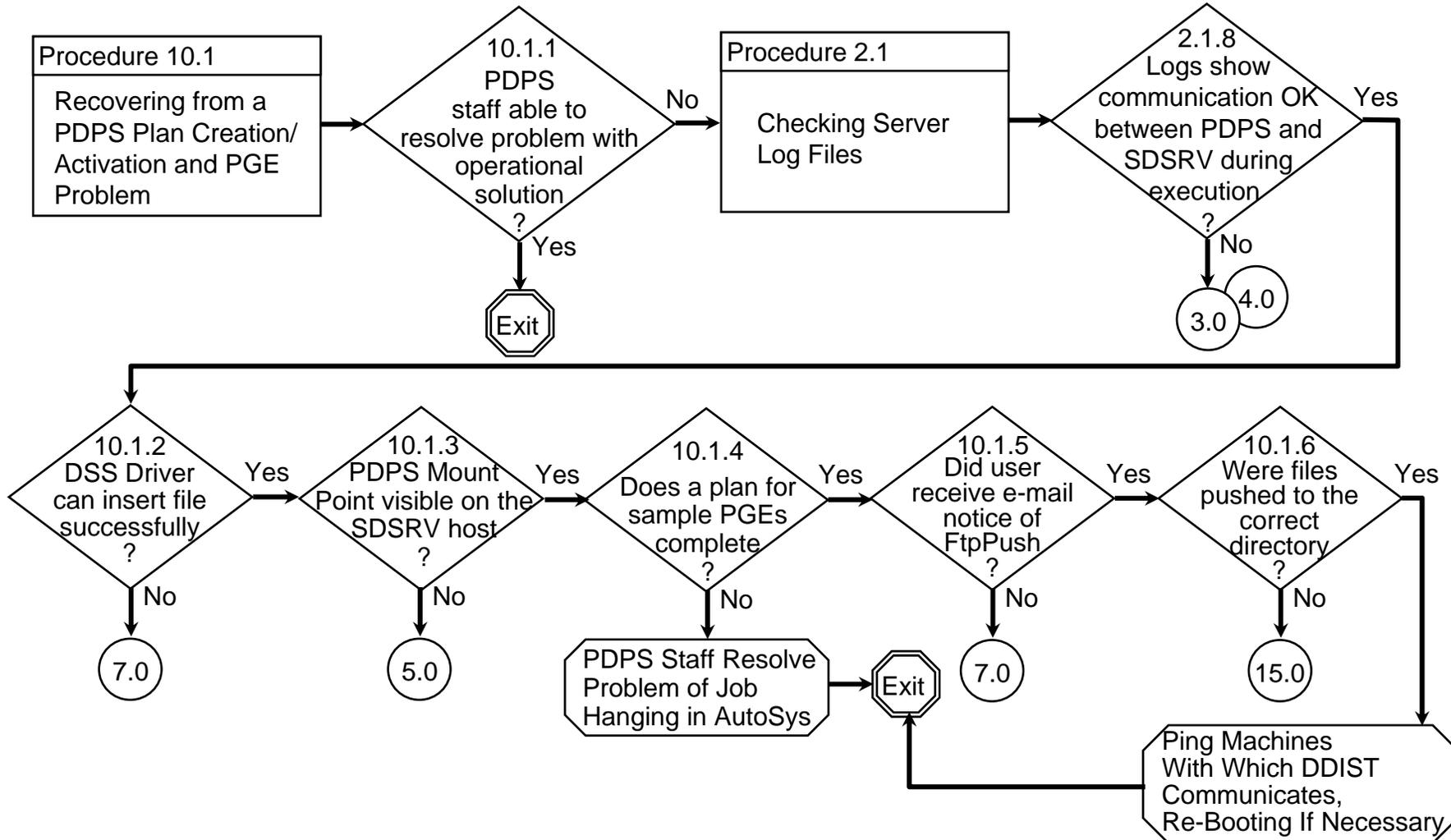


Ingest Problems



- Ingest problems vary depending on type of Ingest
- Ingest GUI should be the starting point; Ingest technician/Archive Manager may resolve many Ingest problems (e.g., Faulty PDR, Threshold problems, disk space problems, FTP error, Ingest processing error)
- Have technician perform a test ingest of appropriate type
 - Check for granule insertion problems
 - Check Archive and Inventory databases for appropriate entries

10.0: Planning and Data Processing Problems



PDPS Plan Creation/Activation and PGE Problems



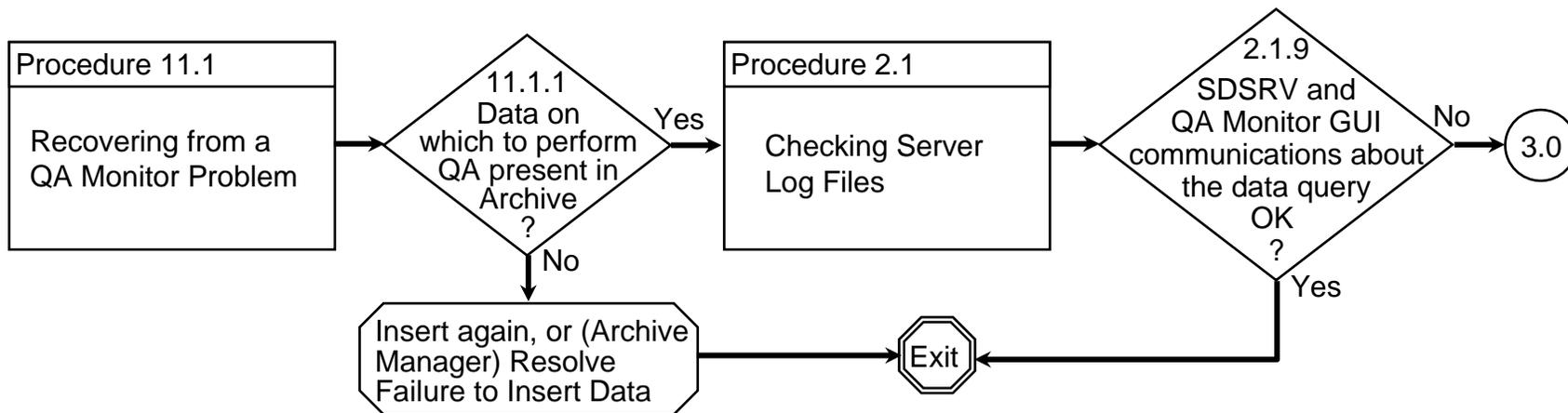
- **Production Planning and Processing depend on registration and functioning of PGEs, and on data insertion and archiving**
- **Initial troubleshooting by PDPS personnel**
- **Check logs for evidence of communications problems between PDPS and SDSRV**
- **Have PDPS check for failed PGE granule; refer problem to SSI&T?**
- **Insert small file and check for granule insertion problems**
- **Check that PDPS mount point is visible on SDSRV and Archive Server hosts**

PDPS Plan Creation/Activation and PGE Problems (Cont.)



- **Have PDPS create and activate a plan for sample PGEs (e.g., ACT and ETS)**
 - **Ensure necessary input and static files are in SDSRV**
 - **Ensure necessary ESDTs are installed**
 - **Ensure there is a subscription for output (e.g., AST_08)**
- **Check for PDPS run-time directories**
- **Determine if the user in the subscription received e-mail concerning the FtpPush**
- **Determine if the files were pushed to the correct directory**
- **Execute *EcCslDPingServers*, noting machines with which DDIST communicates from x0dis02**

11.0: Quality Assessment Problems

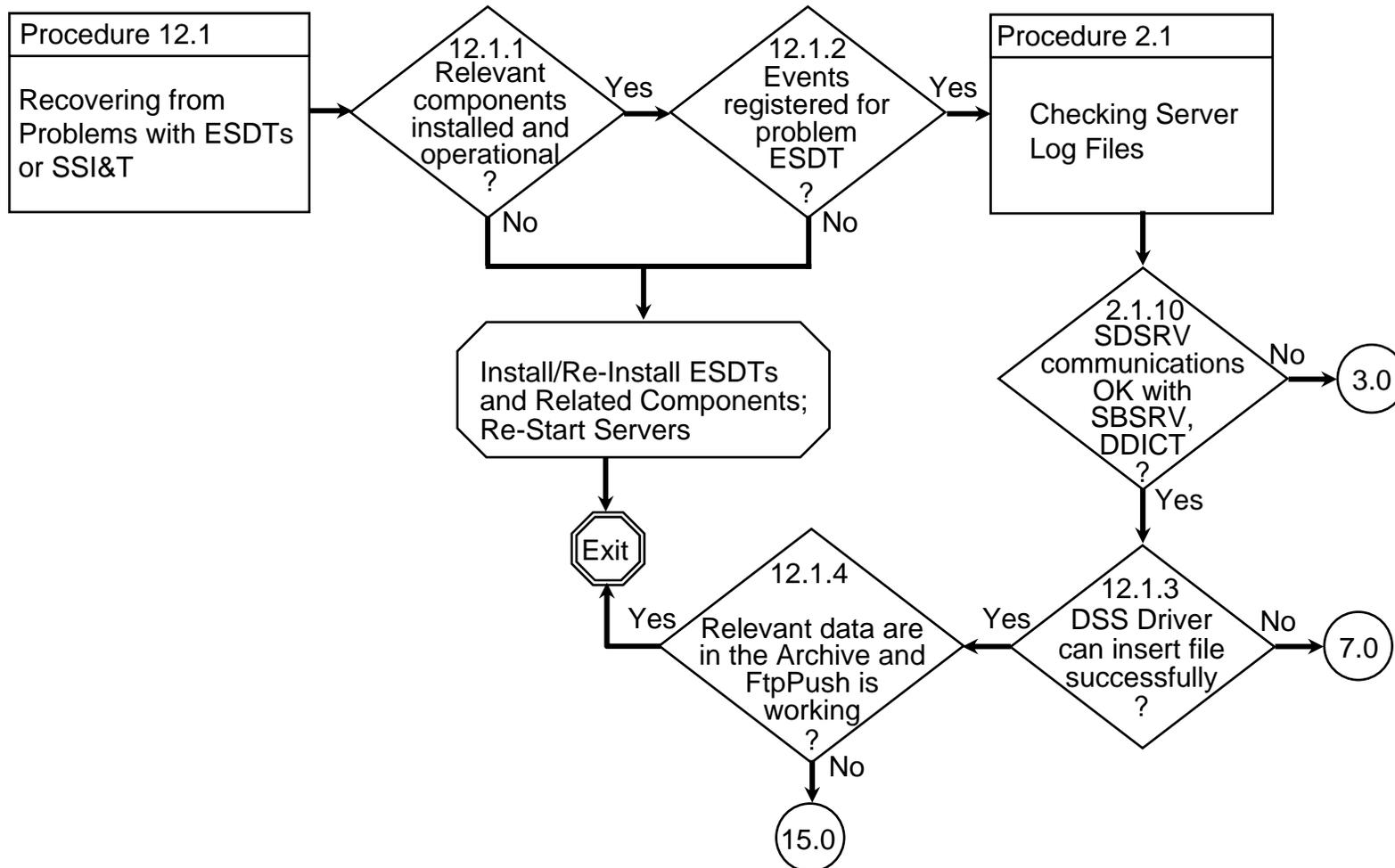


QA Monitor Problems



- **QA Monitor GUI is used to record the results of a QA check on a science data product (update QA flag in the metadata)**
- **Operator may handle error messages identified in Operations Tools Manual (Document 609)**
- **Check that the data requested are in the Archive**
- **Check SDSRV logs to ensure that the data query from the QA Monitor was received**
- **Check QA Monitor GUI log to determine if the query results were returned**
 - **If not, check SDSRV logs for communications errors**

12.0: Problems with ESDTs or SSI&T



ESDT Problems



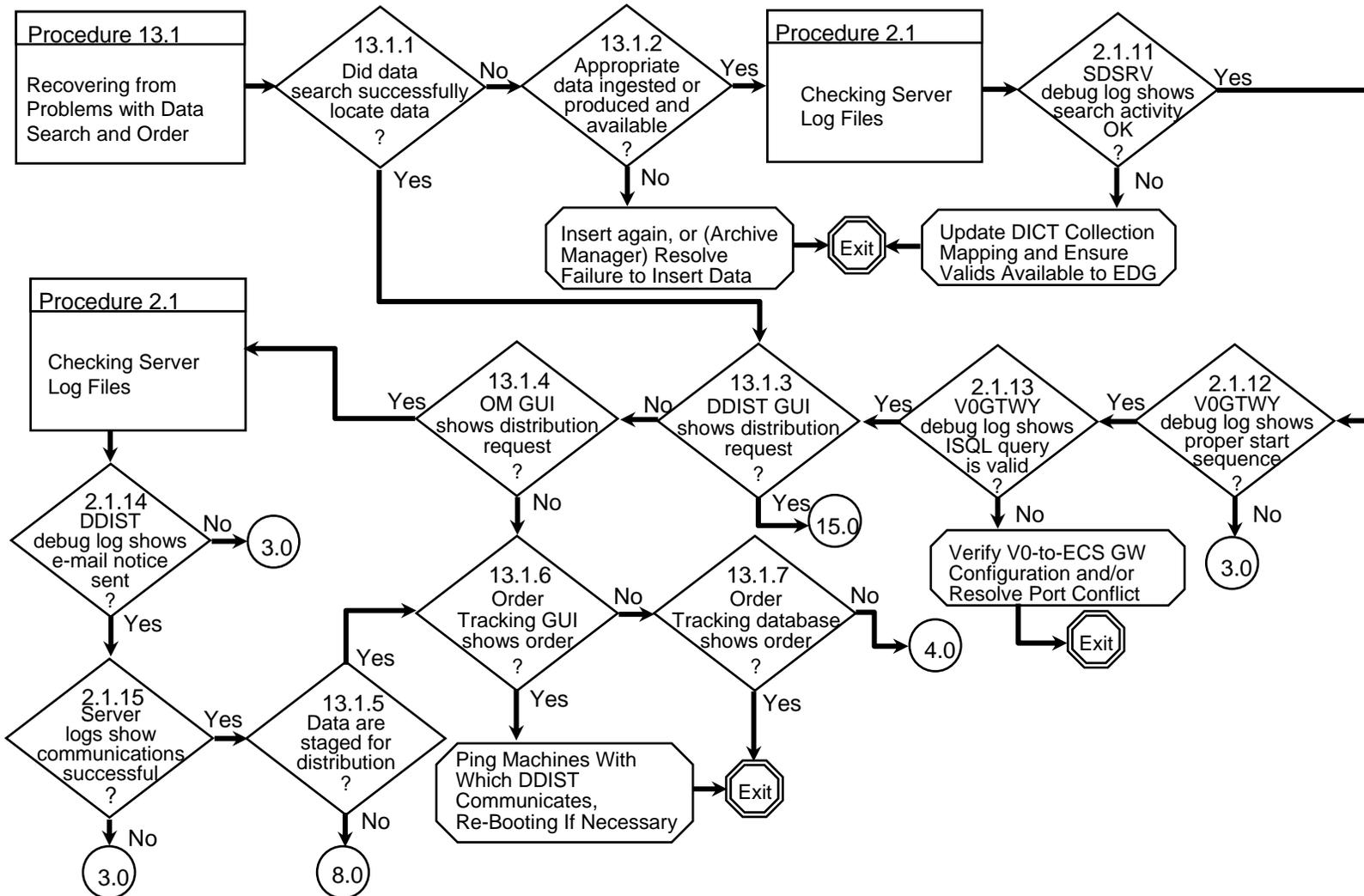
- **Each collection (of a type of data) is described by an ESDT**
 - **Descriptor file has collection-level metadata attributes and values, granule-level metadata attributes (values supplied by PGE at run time), valid values and ranges, list of services**
- **Check SDSRV GUI to ensure ESDT is installed**
- **Check SBSRV GUI to ensure events are registered**
- **Check that DDICT is installed and up**
- **Check SDSRV GUI for event registration in ESDT Descriptor information**
- **Check log files for errors in communication between SDSRV, SBSRV, and DDICT**

Problems with Insertion/ Acquire and SSI&T Tools/GUIs



- **Check that Algorithm Integration and Test Tools (AITTL) are installed**
- **Check that ESDTs are installed**
- **Check for granule insertion problems**
- **Check archive for presence of the relevant data (e.g., Delivered Algorithm Package)**
- **Check for problems with FtpPush distribution**

13.0: Problems with Data Search and Order



Data Search Problems



- **Data Search and Order functions, including V0GTWY/DDICT connectivity, are key to user access**
- **List files in Archive to check for presence of file (/dss_stk1/<MODE>/<data_type_directory>)**
- **Check SDSRV logs for problems with search**
- **Review V0GTWY log to check that V0GTWY is using a valid *isql* query**
- **Ensure compatibility of collection mapping database used by DDICT and the EOS Data Gateway Web Client search tool**
 - **If necessary, perform collection mapping for DDICT (using DDICT Maintenance Tool)**
 - **Contact EOSDIS V0 Information Management System to check status of any recently exported ECS valids**

Data Order Problems



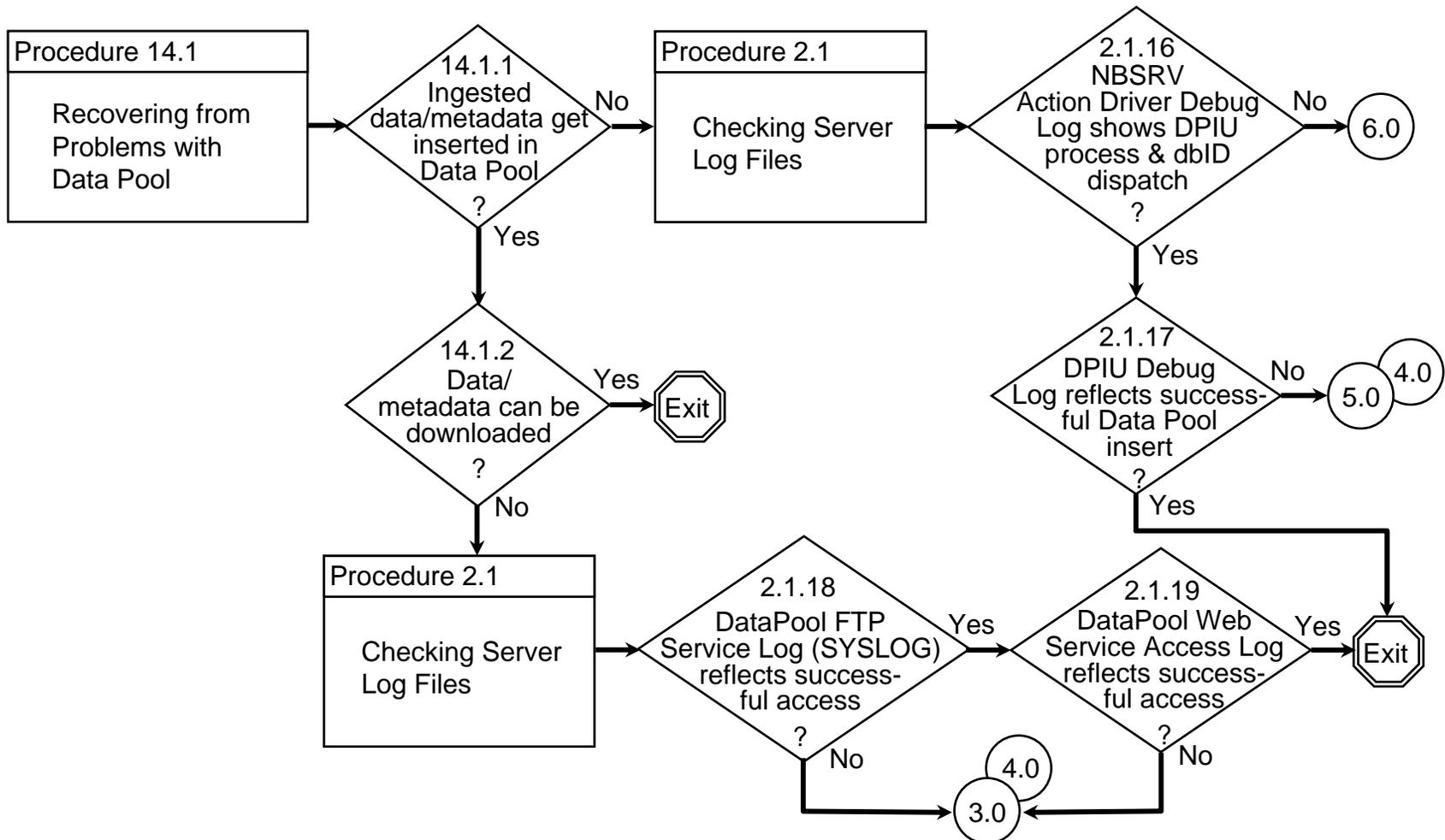
- **Registered user must be able to order products**
- **Check for data search problems**
- **Use DDIST GUI to determine if DDIST is handling a request for the data, and to monitor progress**
- **Use the Order Manager (OM) GUI to determine if Order Manager is handling a request for the data, and to monitor the progress, intervening as appropriate**
- **Determine if the user received e-mail notification**
- **Check server logs to determine where the order failed; check the OM server .ALOG to determine if there are any errors associated with its handling of the request; check SDSRV GUI to determine if SDSRV received the Acquire request from the Order Manager or PDS**

Data Order Problems (Cont.)



- **Check DDIST staging area for presence of data; check staging disk space**
- **Use ECS Order Tracking GUI to check that the order is reflected in MSS Order Tracking; check database**
- **Execute *EcCslDPingServers*, noting machines with which DDIST communicates from x0dis02**

14.0: Problems with Data Pool

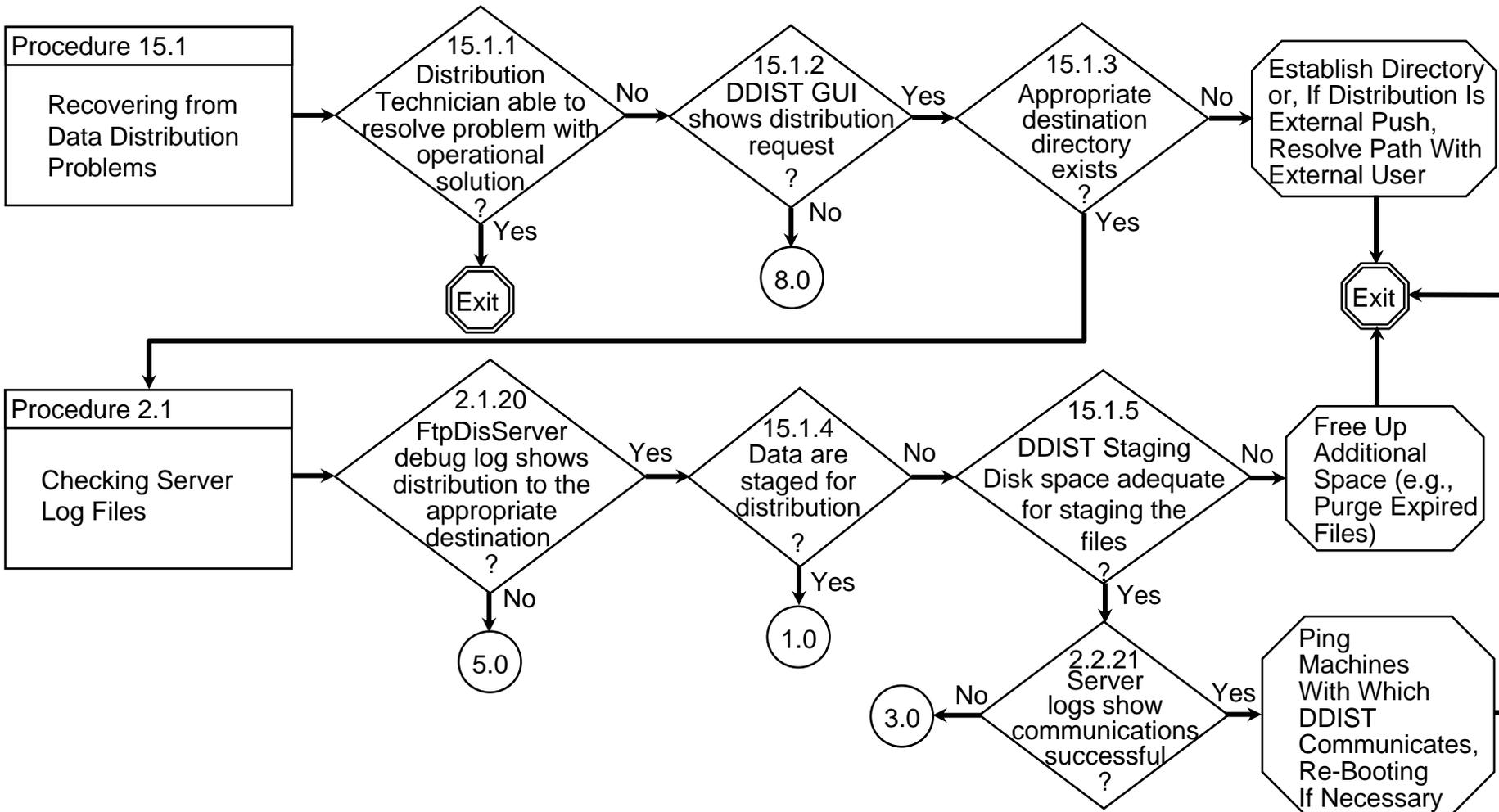


Problems with Data Pool (Cont.)



- **Data Pool: on-line access (by Web Access Tool or**
- **FTP) to science data, metadata, and browse data**
- **Check if ingested data and/or metadata appear in Data Pool (use Web Access Tool or FTP)**
- **Check NBSRV Action Driver debug log for Data Pool Insert Utility (DPIU) activation and dbID dispatch**
- **Check DPIU log for successful Data Pool insert**
- **To check download function, use Web Access Tool or FTP**
- **If data are not downloaded, check SYSLOG for FTP activity and Web Access log for access activity**

15.0: Data Distribution Problems



Problems with FtpPush Distribution



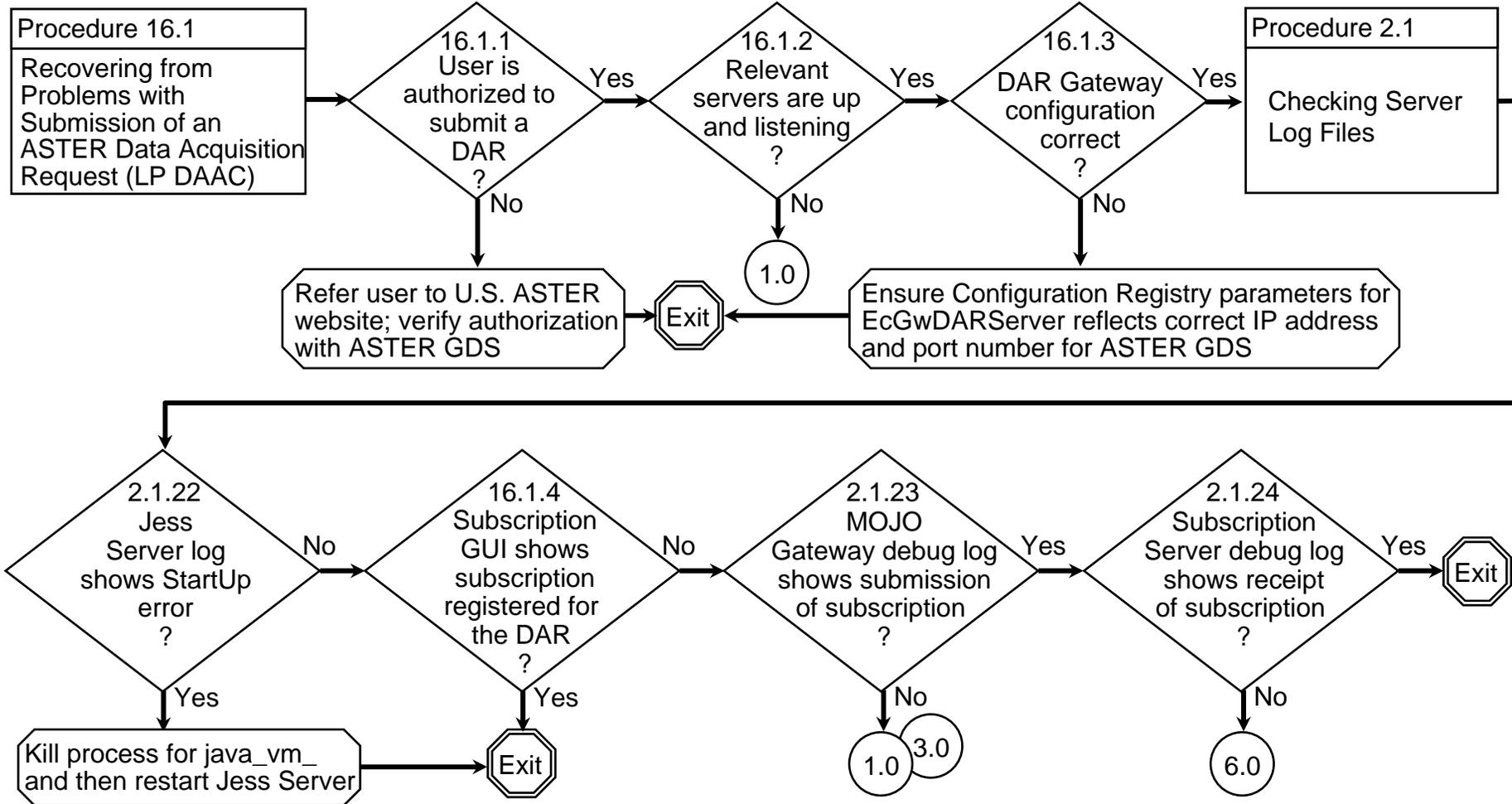
- **FtpPush process is central to many system functions**
- **Use DDIST GUI to determine if DDIST is handling a request for the data, and to monitor progress**
- **Check server logs (FtpDis, DDIST) to ensure file was pushed to correct directory**
- **Check that the directory exists**
- **Check FtpDis logs for permission problems**
- **Check for Archive Server staging of file; check staging disk space**
- **Check server logs to find where communication broke down**

Problems with FtpPull Distribution



- **FtpPull is key mechanism for data distribution**
- **Use DDIST GUI to determine if DDIST is handling a request for the data, and to monitor progress**
- **Check that the directory to which the files are being pulled exists**
- **Check FtpDis logs for permission problems**
- **Check for Archive Server staging of file**
- **Check server logs to find where communication broke down**
- **Execute *EcCslidPingServers*, noting machines with which DDIST communicates from x0dis02**

16.0: Problems with Submission of a Data Acquisition Request (LP DAAC)



Problems with DAR Submission



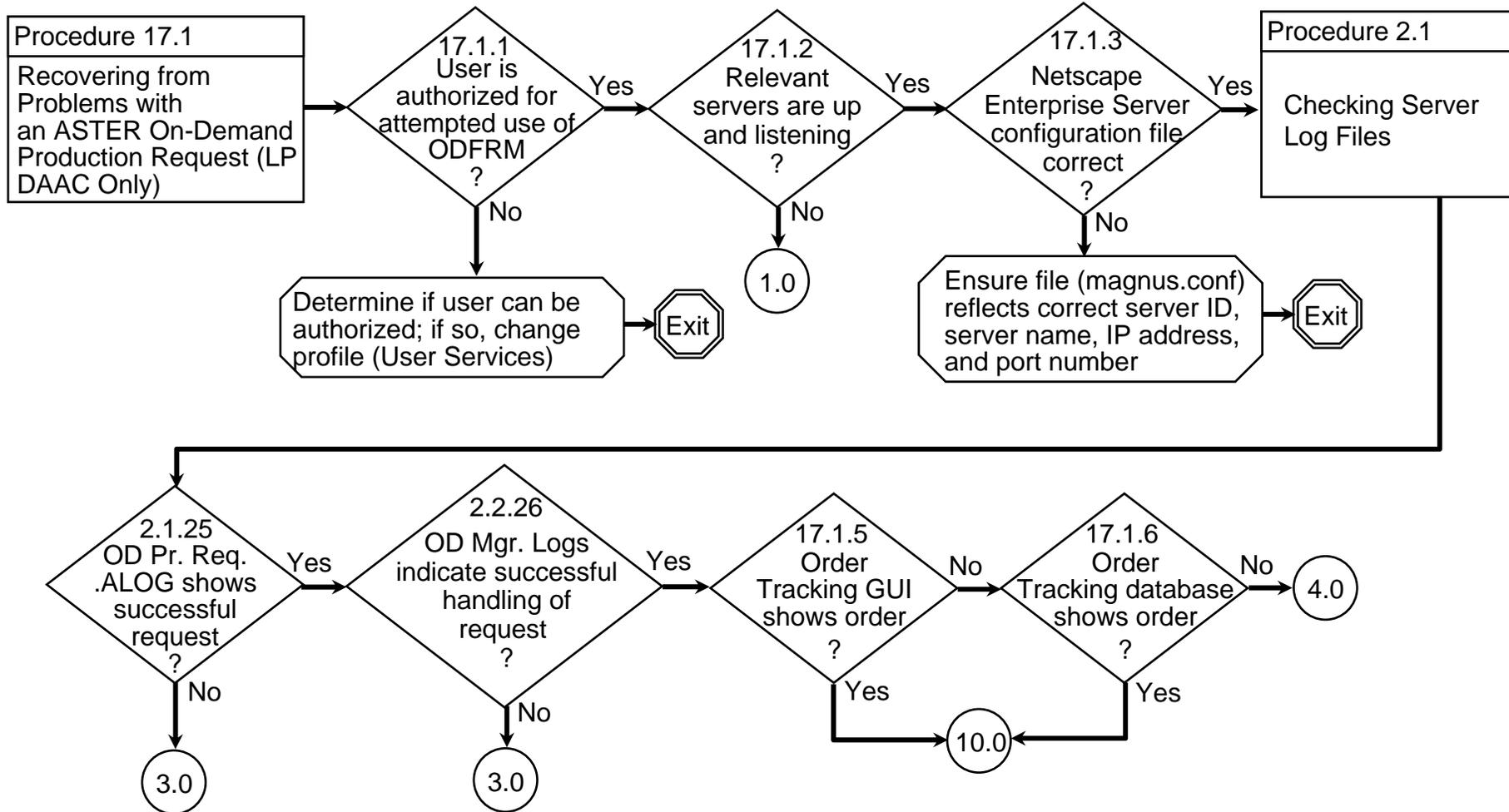
- **LP DAAC supports the ASTER DAR Tool to enable authorized users to submit ASTER Data Acquisition Requests to the ASTER GDS**
- **Check for accounts**
 - Registered user with DAR permissions
 - Account established at ASTER GDS
- **Check that servers are up and listening**
 - EcMsAcRegUserSrvr (on e0mss21)
 - EcGwDARServer (on e0ins01)
 - EcSbSubSrvr (on e0ins01)
 - EcCsMojoGateway (on e0ins01)
 - EcCIWbJestSv.jar (on e0ins02)
 - Netscape Enterprise Server (on e0dms03)

DAR Submission Problems (Cont.)



- **Check Configuration Registry to ensure that the IP address and port for the EcGwDARServer are correct (Note: This check may need to be done by the Configuration Management Administrator)**
- **Examine server log files**
 - Ongoing activity indicates servers are functioning
 - Check at time of problem for evidence of communications breakdown or other problems
- **Determine if subscription worked**
 - Mojo Gateway debug log should reflect submission of subscription
 - Subscription Server debug log should reflect receipt of subscription

17.0: Problems with On-Demand Production Requests (LP DAAC)



Problems with On-Demand Production Requests



- **Authorized users may use the On-Demand Form Request Manager (ODFRM) to submit on-demand requests for production of ASTER L1B and Digital Elevation Model data; any user may order other ASTER higher-level data products (*Note: On-Demand access available through the EDG tool; ODFRM is generally not used*)**
- **Check user account information**
 - Registered user with appropriate permissions
- **Check that servers are up and listening**
 - EcMsAcRegUserSrvr (on e0mss21)
 - EcMsAcOrderSrvr (on e0mss21)
 - Netscape Enterprise Server (on e0dms03)
 - EcPIOdMgr (on e0pls02)
 - EcSbSubSrvr (on e0ins01)

Problems with On-Demand Production Requests (Cont.)



- **Check Enterprise Server configuration file for correct setup of server and port**
- **Check server log files for communication between ODFRM and ODPRM and correct handling of on-demand request**
 - Enterprise Server *access* and *errors* logs (on e0dms03)
 - EcClOdProductRequest.ALOG (on e0ins02)
 - EcPIOdMgr.ALOG (on e0pls02)
 - EcPIOdMgrDebug.log (on e0pls02)
- **Use ECS Order Tracking GUI to check that the order is reflected in MSS Order Tracking; check database**

Trouble Ticket (TT)



- **Documentation of system problems**
- **COTS Software (Remedy)**
- **Documentation of changes**
- **Failure Resolution Process**
- **Emergency fixes**
- **Configuration changes → CCR**

Using Remedy



- **Creating and viewing Trouble Tickets**
- **Adding users to Remedy — TT Administrator**
- **Controlling and changing privileges in Remedy — TT Administrator**
 - **Select group to which a user is assigned**
 - **Select forms accessible by groups**
 - **Specify fields a group may view or view and change**
- **Generating Trouble Ticket reports — System Administrator, others**

Remedy User Form Screen



Remedy User – User (New)

File Edit View Tools Actions Window Help

New User Save

Entry-Id
[Text Field]

Status
◆ Current

License Type
◆ Read ◆ Fixed ◆ Floating

Login name
[Text Field]

Password
[Text Field]

Email Address
[Text Field] ...

Group list
[Text Field] ▼ ...

Full Name
[Text Field] ...

Phone Number
[Text Field]

Home DAAC
[Text Field]

Default Notify Mechanism
◆ None ◆ Notifier ◆ E-mail

Full Text License Type
◆ None ◆ Fixed ◆ Floating

Creator
[Text Field]

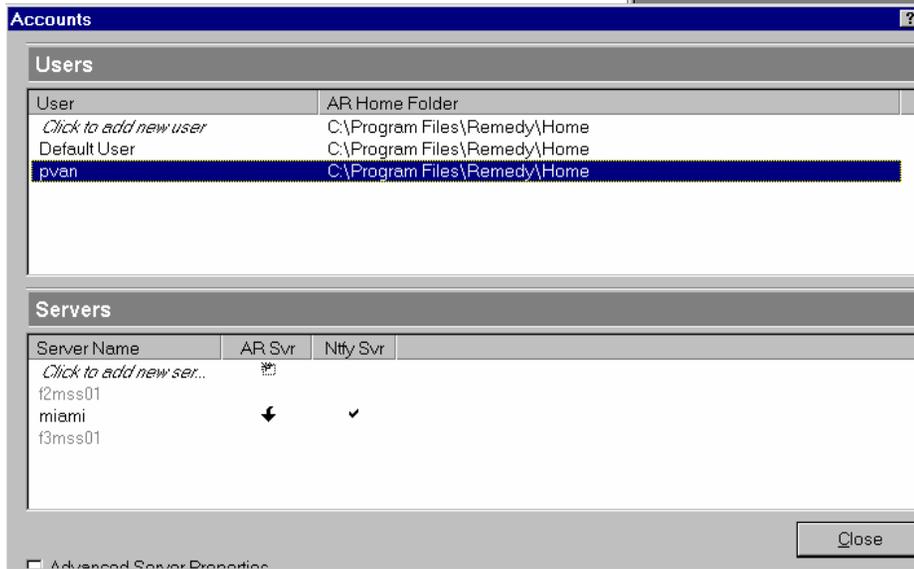
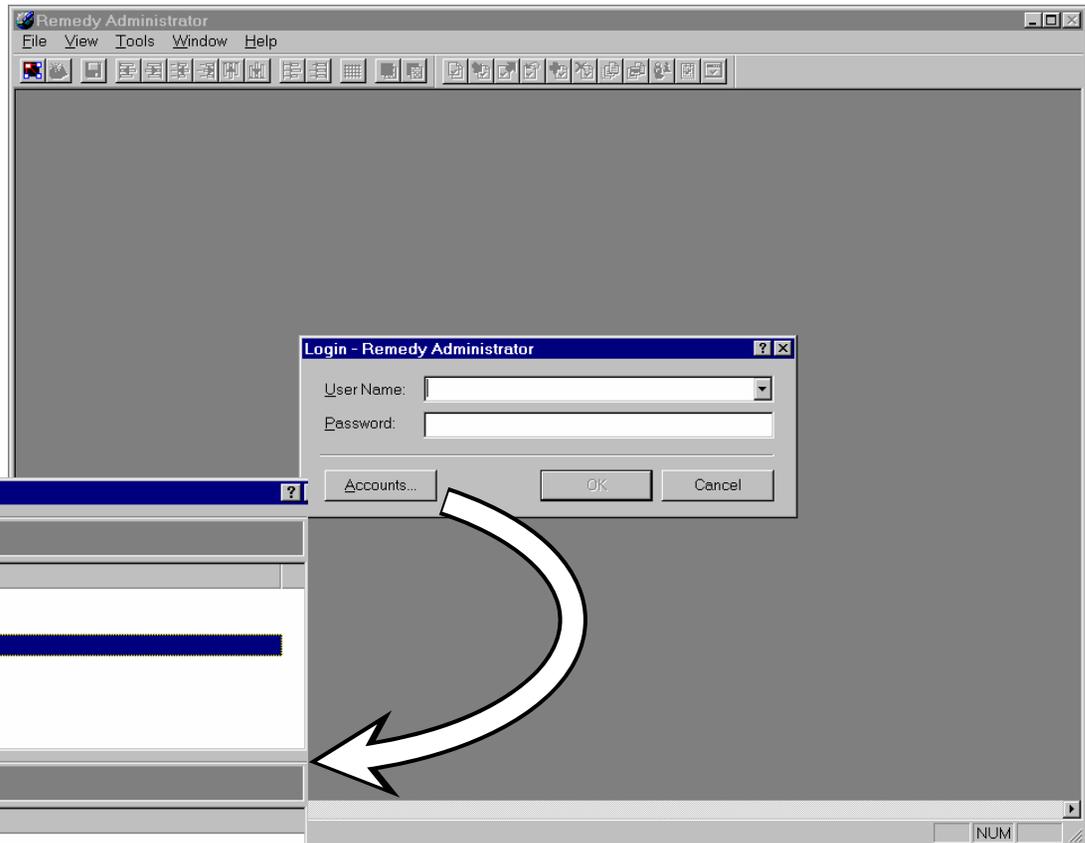
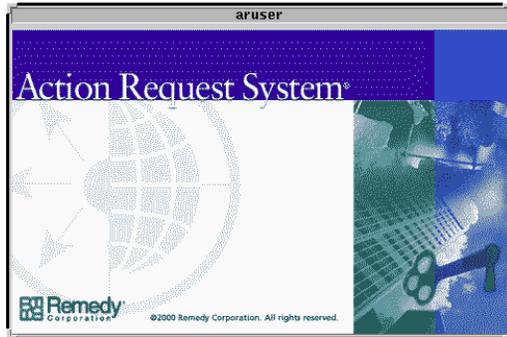
Create-date
[Text Field] ...

Last-modified-by
[Text Field]

Modified-date
[Text Field] ...

Ready [] pvan miami

Remedy Admin Log In



Remedy Admin Server Window



Remedy Administrator - Server Window 1 (miami)

File Edit View Tools Window Help

Server Window 1 (miami)

- Servers
 - miami
 - Forms
 - Active Links
 - Filters
 - Escalations
 - Guides
 - Applications
 - Packing List
 - Menus
 - Groups

Forms:

Name
User
Trouble-Ticket-Xfer
Test Schema 3
Test Schema 2
Test Schema
SMC-Forward to DDTS
RelB-TT-Times
RelB-TT-Sites
RelB-TT-NSI
RelB-TT-ForwardToSMC
RelB-TT-ForwardToSite
RelB-Trouble Tickets
RelB-Software Information
RelB-Menu-Software Resources
RelB-Menu-Problem Type
RelB-Menu-NotifyGeneral
RelB-Menu-Key Words
RelB-Menu-Hardware Resources
RelB-Menu-Closing Codes
RelB-Hardware Information
RelB-Contact Log
Group
DDTS Project List
Build-Name-Schema

Servers: 1 Forms: 24

NUM

Adding Users to Remedy



- **Status**
- **License Type**
 - Read
 - Fixed Write
 - Floating Write (5 per DAAC)
- **Login Name**
- **Password**
- **Email Address**
- **Group List**
- **Full Name**
- **Phone Number**
- **Home DAAC**
- **Default Notify Mechanism**
- **Full Text License**
- **Creator**

Changing Privileges in Remedy



- **Group assignment determines privileges of a user**
- **Form Permissions of a group determine which forms a user can choose from the Open dialog of the User form**
- **Field Permissions of a group determine user access to fields on a form**
 - **View**
 - **Change**

Group Permissions Window



The screenshot displays the 'Group Permissions - User Services' dialog box. The 'Form' tab is active, showing a list of fields under 'No Permission' and 'Permission'. The 'RelB-Trouble Tickets' form is selected. A yellow arrow points to the 'Field Permissions' tab. Another yellow arrow points to the 'Groups' list in the background window.

Form: RelB-Trouble Tickets

No Permission:

- 536870969
- Close-date
- Closed-by
- Closing Code
- Create-date
- Detailed Resolution Log
- Forward-date
- Forwarded-by
- Forwarded-to-1
- Forwarded-to-2
- Forwarded-to-3
- Forwarded-to-4
- Hardware Information
- Hardware Resource
- Last-modified-by
- Last-Modified-date
- Long-Description

Permission:

- View
- Change
- List This TT's Duplicate(s)
- Problem Type
- Submitter eMail
- Submitter Home DAAC
- Submitter ID
- Submitter Name

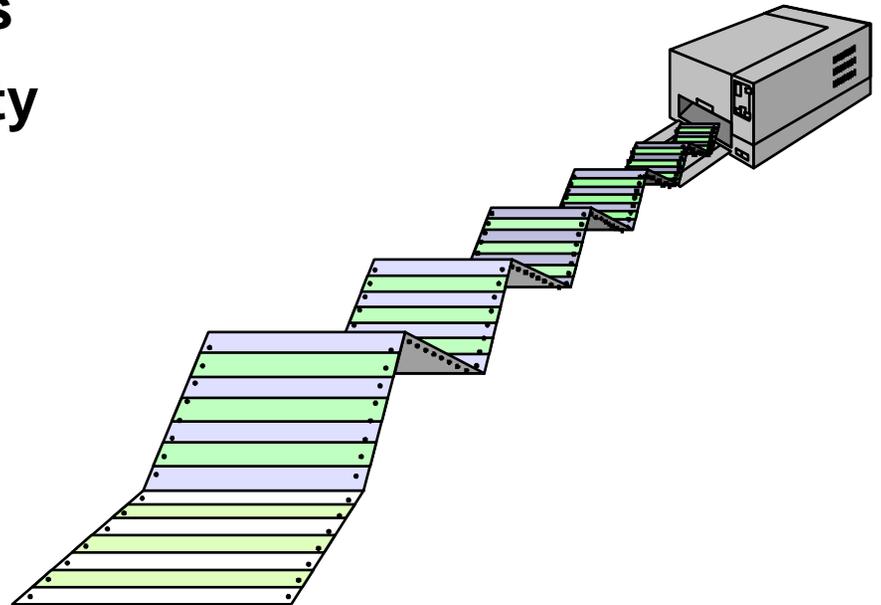
Groups:

- Assignee
- Assignee Group
- Brower
- NotifyAssignedEscal
- NotifyImpSolEscal
- NotifyNewEscal
- NotifyOnNew
- NotifySolImpEscal
- NotifySolPropEscal
- Operator
- Ops Supervisor
- Public
- Resolution Technician
- Resource Manager
- Submitter
- TT Review Board Chair
- User Services

Generating Trouble Ticket Reports



- **Assigned-to Report**
- **Average Time to Close TTs**
- **Hardware Resource Report**
- **Number of Tickets by Status**
- **Number of Tickets by Priority**
- **Review Board Report**
- **SMC TT Report**
- **Software Resource Report**
- **Submitter Report**
- **Ticket Status Report**
- **Ticket Status by Assigned-to**



Remedy Admin - Reports



Report -- RelB-Trouble Tickets (t1 mss06)

File View Tools Report Window Help

Report Styles

Name	Type	Comment	Path
ForwardToSite Email Report	Remedy	Outputs an Opened TT's Contents in eMail form	/home/cmshared/arHome/arcr
ForwardToSite Email Rpt(Jun	Remedy		/home/cmshared/arHome/arcr
Forward Set Up (old)	Remedy		/home/cmshared/arHome/arcr
Hardware Resource Report	Remedy	Outputs a report sorted and grouped by Hardwar	/home/cmshared/arHome/arcr
NSI-EBnet-Report	Remedy		/home/cmshared/arHome/arcr
Number of Tickets by Priority	Remedy	Outputs the number of Trouble Tickets grouped k	/home/cmshared/arHome/arcr
Number of Tickets by Status	Remedy	Outputs the number of Trouble Tickets grouped k	/home/cmshared/arHome/arcr
Review Board Report	Remedy	Outputs a report of the details of TTs for the TT F	/home/cmshared/arHome/arcr
SMC Hardware Report	Remedy		/home/cmshared/arHome/arcr
SMC TT Report	Remedy	Outputs a report to be sent to the SMC.	/home/cmshared/arHome/arcr
Software Resource Report	Remedy	Outputs a report sorted by Software Resources ε	/home/cmshared/arHome/arcr
Submitter Report	Remedy	Outputs a report by submitter.	/home/cmshared/arHome/arcr
Ticket Status by Assigned-Ti	Remedy	Outputs a report sorted and grouped by the last	/home/cmshared/arHome/arcr
Ticket Status Report	Remedy	Outputs a report sorted and grouped by Ticket S	/home/cmshared/arHome/arcr
mailOnClose	Remedy		/home/cmshared/arHome/arcr

Style Preview

```

Ticket Status Report

Ticket Status      Ticket-Id
-----
Sum =
    
```

150 in report cmshared t1mss06

Operational Work-around



- **Managed by the Operations Coordinator at each center**
- **Master list of work-arounds and associated trouble tickets and configuration change requests (CCRs) kept in either hard-copy or soft-copy form for the operations staff**
- **Hard-copy and soft-copy procedure documents are “red-lined” for use by the operations staff**
- **Work-arounds affecting multiple sites are coordinated by the EMD organizations and monitored by EMD Project staff**